City of Pasco Comprehensive Sewer Plan

MSA

Murray, Smith & Associates, Inc.

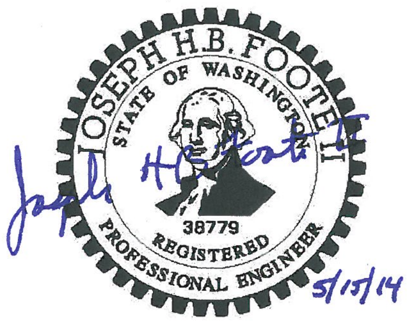
May 2014

COMPREHENSIVE SEWER PLAN

FOR

CITY OF PASCO

MAY 2014



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EXECUTIVE SUMMARY

Introduction

The City of Pasco (City) retained the services of Murray, Smith & Associates, Inc. (MSA) to prepare this Comprehensive Sewer Plan (Plan). The general mission of the Plan is to develop a plan that will define an effective, sustainable and economical approach to manage the current and future needs for the City.

Background/Need

The City owns and operates a wastewater collection and treatment system to manage the domestic wastewater needs of the community. The City operates the system under a National Pollutant Discharge Elimination System Waste Discharge Permit issued by the Washington State Department of Ecology. The previous Plan was completed in 1992 and amended in 1999. Recent growth in the City, which has resulted in increased wastewater flows, coupled with significant urban expansion since the last planning effort was completed, requires the need to develop a comprehensive plan that reflects current conditions and growth projections.

Future Conditions

In collaboration with City staff, future conditions were identified to use in the comprehensive planning process. Population projections, wastewater flows and loadings were estimated using County and City planning documents and existing wastewater flow data. The future service area includes the entire City's Urban Growth Area (UGA) and two (2) areas outside the UGA that have been defined by the City as potential future services areas.

Systems Analysis

Wastewater collection and treatment systems were analyzed to identify existing deficiencies and determine their capabilities to meet future conditions. For the wastewater collection system, a hydraulic computer model of the system was created to simulate the network of sewers and lift stations in the system. The hydraulic model allowed for the evaluation of system performance under multiple flow scenarios that represent current and future conditions. The model also allowed for the development of strategies to serve areas currently outside the City's existing service area.

At the wastewater treatment plant, unit processes were evaluated based on industry standards and previous assessments to define existing plant capacity and determine its capability to meet future conditions. The processes were evaluated using current and future flows and loading projections as well as anticipated future regulatory requirements that will place greater restriction on effluent water quality.

Summary of Systems Analysis

- The existing collection system is in relatively good shape and has the capacity to accommodate current and future flows within the planning period with relatively few system improvements.

- Expansion of the collection system to serve future service areas can be accommodated by the existing collection system and wastewater treatment plant.

- The wastewater flows over the planning period can be accommodated by the existing wastewater treatment plant. A second wastewater treatment plant in West Pasco is not cost effective or necessary within the planning period.

- The existing wastewater treatment plant is in relatively good condition and performing well. The plant has the capabilities to expand processes and meet future flow and regulatory conditions.

Capital Improvement Program

Through the analysis of the City’s wastewater collection and treatment systems to accommodate current and future conditions, system improvements were identified and opinions of cost developed. Through workshops with City staff, system improvements were further refined and prioritized in order to create a Capital Improvement Program for the 20-year planning period. Table ES-1 provides as summary of the Capital Improvement Program.

Table ES-1
City of Pasco
Comprehensive Sewer Plan - Capital Improvement Program

Wastewater Treatment Plan Improvement Project Description	Need[1]	Est. Cost (x1000)	Planned Year of Project and Estimated Cost in 2013 $'s (x 1000)																				
			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Biosolids Dewatering	**System Growth/Expansion**			$500																			
Primary Treatment Expansion/Improvement - Primary Clarifier No. 3	**Flow**	$2,340		$250	$2,090																		
Waste Activated Thickening	**System Growth/Expansion**	$883					$106	$777															
Secondary Clarification Expansion/Improvement Phase 1	**Flow**	$3,016							$348	$2,668													
Headworks Improvements	**Condtion**	$2,015							$700	$1,315													
Secondary Treatment - Nitrification	**Regulatory**	$11,592								$500	$1,300	$4,896	$4,896										
River Outfall Upgrade Phase 1	**Flow**	$561								$68	$493												
Primary Treatment Expansion/Improvement - Primary Clarifier No. 4	**Flow**	$1,547									$150	$1,397											
Process Building	**System Growth/Expansion**	$819											$95	$724									
Anaerobic Digestion - Digester No. 3	**Flow**	$5,540													$660	$2,440	$2,440						
River Outfall Upgrade Phase 2	**Flow**	$1,913														$230	$1,683						
Secondary Treatment - Phosphorus Removal	**Regulatory**	$6,541																			$785	$2,878	$2,878
Secondary Clarification Expansion/Improvement Phase 2	**Flow**	$2,690																				$310	$2,380
TOTAL - ALL IMPROVEMENTS		**$39,457**	**$0**	**$750**	**$2,090**	**$0**	**$106**	**$777**	**$1,048**	**$4,551**	**$1,943**	**$6,293**	**$4,991**	**$724**	**$660**	**$2,670**	**$4,123**	**$0**	**$0**	**$0**	**$785**	**$3,188**	**$5,258**

Collection System Improvement Project Description	Need[1]	Est. Cost (x1000)	Planned Year of Project and Estimated Cost in 2013 $'s (x 1000)																				
			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Additional Flow Monitoring and Data Collection	**Condition**	$60		$60																			
Maitland Lift Station Improvements	**Condition**	$125		$125																			
West Pasco Trunk Sewer Repair	**Condition**	$2,315		$446	$1,870																		
9th and Washington Lift Station Improvements - Phase 1	**Condition**	$677			$78	$599																	
Pearl Street Lift Station Improvements	**Condition**	$194			$23	$171																	
West Pasco Trunk Corrosion and Odor Control - Phase 1	**Condition**	$287				$28	$259																
Road 44 Corrosion and Odor Control - Phase 1	**Condition**	$68					$18	$50															
Road 44 Corrosion and Odor Control - Phase 2	**Condition**	$624						$57	$567														
Road 44 Corrosion and Odor Control - Phase 3	**Condition**	$715							$83	$632													
West Pasco Trunk Corrosion and Odor Control - Phase 2	**Condition**	$763								$88	$675												
9th and Washington Lift Station Improvements Phase 2	**Flow**	$754																				$87	$667
Chapel Hill Blvd. Extension - Sewer	**System Growth/Expansion[2]**	$550						$50	$500														
Sewer Line Extension - Rd 100	**System Growth/Expansion[2]**	$500						$50	$450														
Capitol Lift Station	**System Growth/Expansion[2]**	$939										$108	$831										
East Lift Station (Riverview Area)	**System Growth/Expansion[3]**	$1,339								$268	$1,071												
30" Main (Northwest Area)	**System Growth/Expansion[3]**	$5,297		$397	$4,900																		
24" Main (Northwest Area)	**System Growth/Expansion[3]**	$7,152												$900	$3,000	$3,252							
North Lift Station (Southeast Industrial Area)	**System Growth/Expansion[3]**	$1,404												$400	$1,004								
21" Main (Northwest Area)	**System Growth/Expansion[3]**	$2,242													$700	$1,542							
West Lift Station (Northwest Area)	**System Growth/Expansion[3]**	$1,694															$1,694						
30" Main (Southeast Industrial Area)	**System Growth/Expansion[3]**	$2,669															$400	$2,269					
West Lift Station (Riverview Area)	**System Growth/Expansion[3]**	$1,028															$200	$828					
East Lift Station (Northwest Area)	**System Growth/Expansion[3]**	$1,860																$200	$1,660				
Annual Sewer Line Re-lining Program[4]	**Condition**	$7,700	$904	$400	$300	$300	$300	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400
Annual Sewer Line Extensions	**System Growth/Expansion**	$5,500	$90	$200	$200	$200	$200	$200	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300
Sewer Line Repair[5]	**Condition**	$2,000	$50	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100
TOTAL - ALL IMPROVEMENTS		**$48,457**	**$1,044**	**$1,728**	**$7,471**	**$1,398**	**$877**	**$907**	**$2,400**	**$1,788**	**$2,546**	**$908**	**$1,631**	**$2,100**	**$5,504**	**$5,594**	**$3,094**	**$4,097**	**$2,460**	**$800**	**$800**	**$887**	**$1,467**
TOTAL - WASTEWATER TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS		**$87,914**																					

Notes
1. Need is defined as the justification for the CIP Improvement and is characterized by four general categories:
- Flow – To accommodate the anticipated wastewater flow and/or loadings
- Condition – Existing facilities require replacement and/or rehabilitation due to their condition and/or service life limitations
- System Growth/Expansion – To support the continued growth and expansion of the system to accommodate a growing service area and population base
- Regulatory – To comply with current or future regulations and permit requirements
2. City planned project prior to CSP.
3. Potenital growth area capital improvements.
4. Includes Road 44 Interceptor Sewer Repair in 2013 budget.
5. This line item is part of the yearly operations and maitenance budget and is just shown for informational purposes.

INTRODUCTION

Purpose

The purpose of this Comprehensive Sewer Plan (Plan) is to provide a holistic approach to addressing the City of Pasco's (City) wastewater collection and treatment needs to meet flows, loads and regulatory demands now and for the foreseeable future. Over the past 10 years the City has seen significant growth which has resulted in increased wastewater flows in the collection system and at the wastewater treatment plant (WWTP). This growth, coupled with significant urban expansion since the last planning effort was completed, requires development of a comprehensive plan that reflects current conditions and growth projections.

Background

The City owns and operates a wastewater collection and treatment system to manage the domestic wastewater needs of the community. The City's collection system is a conventional collection system that mainly relies on gravity sewers to convey wastewater flow to the treatment facility. Pump stations and force mains are used to supplement the gravity system. The City operates an activated sludge WWTP to oxidize, nitrify and disinfect the wastewater flow prior to discharge to the Lake Wallula reach of the Columbia River.

The City originally built a primary treatment facility in 1954 and in 1970 it was upgraded to meet secondary treatment requirements. The most recent major upgrade was in 1998 to increase the capacity of the facility. Recently, minor unit process upgrades were pursued by the City to address process limitations and operations and maintenance issues. The plant currently experiences flows between 4 and 5 million gallons per day (MDG).

Previous Comprehensive Planning

The City's Plan, dated November 1992, was included as a part of the 1995-2015 Comprehensive Plan and adopted by the City Council on August 21, 1995. The Plan provided details for proposed improvements for the City to meet future growth and expansion of the sewer service area to the extents of the Urban Growth Area (UGA). The improvements included the establishment of preliminary routes for future trunk sewers, improvements to the wastewater treatment facility and lift stations.

On March 15, 1999, City Council passed Resolution 2433 adopting the 1999 Amendment to the Plan, which refined the location of the trunk sewer to service the Riverview Area to provide a more efficient and cost effective route. On March 29, 1999 the Washington State Department of Ecology approved the 1999 Amendment.

Approach

With the age of the previous planning documents, combined with the recent system growth, a significant portion of the comprehensive planning process was dedicated to understanding current system conditions and limitations. Since the last Comprehensive Sewer Plan, the system has greatly expanded and flows increased, significantly impacting the characteristics and performance of both the collection and treatment systems. Understanding the current characteristics and performance of these systems was vital in the selection and evaluations of feasible alternatives for system improvements to meet current and future needs.

Because this understanding of current system characteristics and performance was critical in the planning process, the approach to completing the Comprehensive Sewer Plan is based on close collaboration with City staff.

Study Area and Study Period

The study area for this plan includes all area with the City's UGA and two (2) areas outside the UGA that have been defined by the City as potential future services areas. The study period for this Plan is a 20-year planning period.

Scope of Work

Murray, Smith & Associates, Inc. (MSA) was retained by the City to assist the City in the creation of a Plan. MSA worked closely with the City to develop a Scope of Work that efficiently addresses key issues, engages City staff and the community, takes advantage of existing planning documents and provides the necessary comprehensive planning to guide the City in current and future wastewater management decisions.

The Scope of Work for this Plan includes the following abbreviated elements:

- ***Public Involvement*** – Supporting the City in the public involvement aspects of the project and presentation to City Council.
- ***Data Collection*** **–** Collection and review of all pertinent information on the City's wastewater collection and treatment systems necessary to complete the planning.
- ***Wastewater System Description*** **–** A comprehensive description of the City's wastewater collection and treatment systems.
- ***Future Condition Forecasting*** **–** A projection of future wastewater flows and regulatory requirements that will influence wastewater collection and treatment system needs.
- ***Collection System Analysis*** **–** An evaluation of the collection system's performance and deficiencies under current and future wastewater flow conditions. This element includes development and operation of a hydraulic model to simulate current and future conditions.

- ***Wastewater Treatment Evaluation*** **–** An evaluation of the WWTP's performance and deficiencies under current and future wastewater flow and loading conditions.
- ***Operations and Maintenance Overview*** **–** A general overview of the City's operation and maintenance systems and programs for the wastewater collection and treatment systems.
- ***Wastewater System Needs Inventory and Alternatives Analysis*** **–** Based on system deficiencies identified, review wastewater system needs and alternatives to meet current and future wastewater flow conditions. This includes an analysis of the need for a second WWTP in West Pasco.
- ***Capital Improvement Plan*** **–** Develop a Capital Improvement Plan (CIP) for the 20-year planning period defining recommended wastewater collection and treatment improvements. The development of the CIP will include defining project costs and implementation schedule, and working with the City to define impact on utility rates.
- ***Documentation*** **–** Prepare a single report that documents and summarizes the work performed under this scope of services.

MSA

Section 1

SECTION 1
WASTEWATER SYSTEM DESCRIPTION

Introduction

This section of the Comprehensive Sewer Plan (Plan) provides an overview of the City of Pasco's (City) current wastewater collection and treatment systems including service area, facilities and management structure.

Background

The City built their first wastewater treatment plant (WWTP) in 1954 as a primary treatment facility. In 1970, the plant was modified and added biological treatment to meet secondary treatment requirements for a population equivalent of 30,000. Again in 1998 the treatment facility was upgraded to increase the design capacity to accommodate anticipated growth of the City's service area. In 1992 the City completed its most recent Comprehensive Sewer Plan, which defined the approach for expansion of the existing sewer collection system and WWTP expansion to meet the needs of future growth. This plan was amended in 1999, modifying some of the proposed recommendations for serving areas to the west.

Currently, the City's wastewater collection system contains over 240 miles of sewer pipeline, approximately 4,430 manholes and includes 10 lift stations. The collection system collects primarily domestic wastewater, which is conveyed to the WWTP located in the southeast portion of the City. After treatment, the plant discharges the effluent to the Lake Wallula reach of the Columbia River.

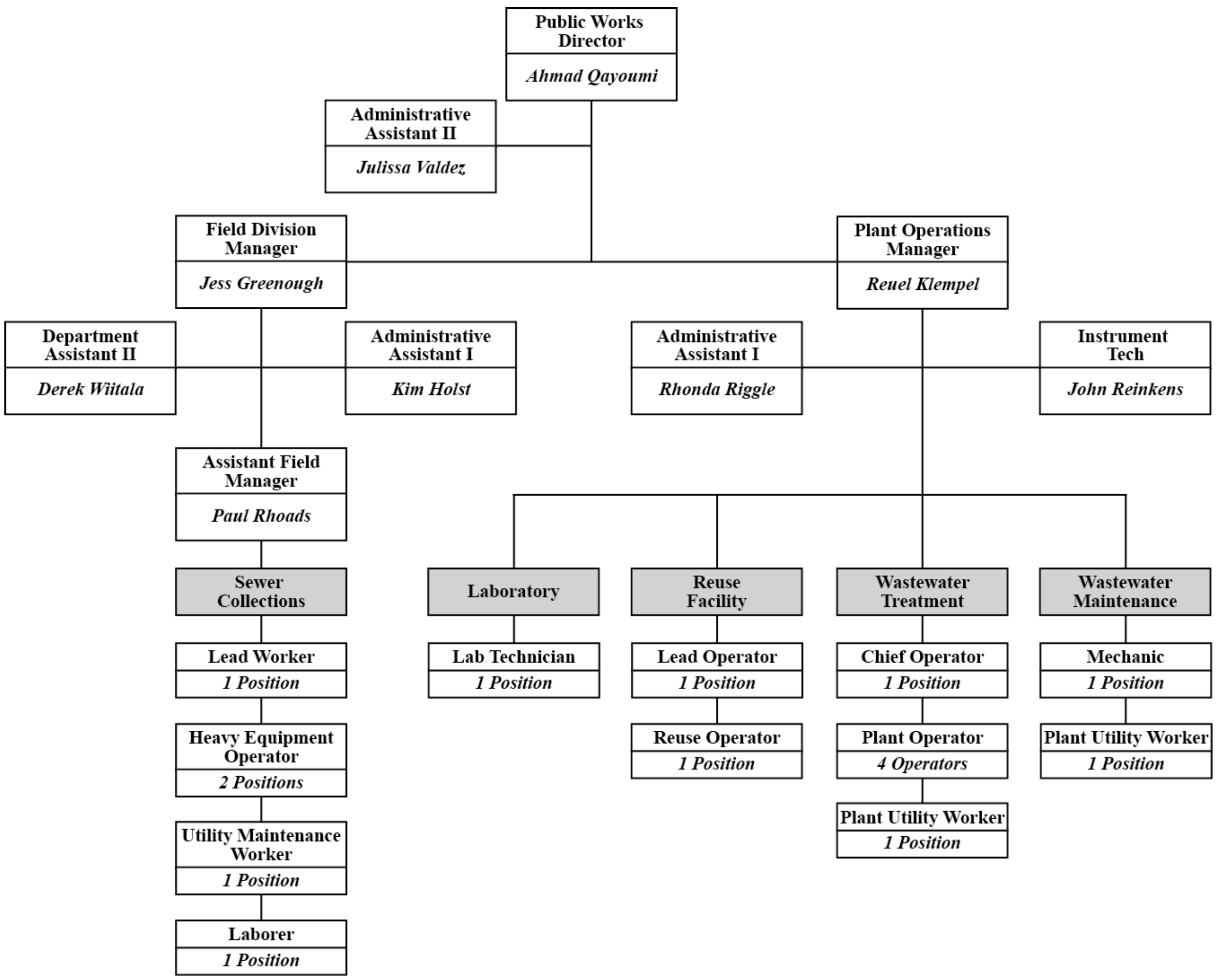
Service area policies of the Sewer Utility are defined in Titles 03, 13, 14 and16 of the Pasco Municipal Code. This includes connection charges and monthly user charges, provisions for use of the sewer system, prohibited discharges to public facilities, requirements for pretreatment, general standards for building sewers, general standards for public sewer construction, and requirements for compliance with the Uniform Plumbing Code.

The City maintains a separate reuse system that collects, stores and then land applies food processor wastewater north of the City. Constructed in 1995, the Reuse Facility was constructed to specifically serve the City's major food processors and is operated seasonally. The Reuse Facility is a separate entity from the City's wastewater collection and treatment systems and therefore is not included in this Plan.

Utility Management Structure

The City's wastewater collection system and treatment plant operate within the Public Works Department under the Field Division Manager and Plant Operation Manager as an enterprise fund (utility). The Plant Operation Manager oversees the wastewater plant and sewer collection system lift stations. The Plant Operation Manager directs the overall operations and maintenance activities, including the laboratory. The Field Division Manager oversees the sewer collection system operation and maintenance. There are 13 staff maintaining the daily operation of the WWTP and lift stations. The collection system is maintained by eight (8) staff. The organizational structure for the utility is shown in Figure 1-1.

Figure 1-1
2012 Public Works Personnel Organization Chart



Service Area

The existing and future collection system service area is shown in Figure 1-3 at the end of this Section. The collection system service area includes all areas within the City limits and Urban Growth Area (UGA) and includes two (2) future service areas outside the UGA. Currently, the City only collects wastewater within the City limits. The future service areas are based on the 20-year planning period, which is discussed in greater detail in Section 2 - Future Conditions. This Plan separates the service area into 20 sewer basins covering over 48 square miles. Figure 1-3 at the end of this Section depicts these sewer basins.

Topography

The topography of the service area consists of flat and gently sloping terrain. The area slopes gently upward, south to north, from the banks of the Columbia River at elevation 340 feet to Riverview Heights at elevation 530 feet. Seasonal watercourses are oriented generally southerly as they drain toward the Columbia River.

Climate

The climate of the area is semi-arid, characterized by low annual precipitation and large inter-seasonal temperature variations. Strong winds from the west and southwest occur throughout the year and are responsible for high evapotranspiration rates in summer.

Annual precipitation seldom exceeds 10 inches, with much of the total arriving with summer thunderstorms. Climatological information for the City is summarized in Table 1-1.

Table 1-1
Summary of Climatological Information

Annual Average Temperature	55.10°F
Annual High Temperature	91.46°F
Annual Low Temperature	27.20°F
Annual Rainfall	8.47 inches

Geology

The geology of the City's planning area is the result of the long history of volcanic activity, which has influenced the geology of the entire Columbia Basin. At the surface is a layer of unconsolidated alluvial and glaciofluvial materials ranging in depth from 0 to 120 feet. The depth of this overburden typically does not exceed 30 feet. The overburden rests on a thick series of basaltic strata, known as the Columbia River Basalts, each of which may consist of many distinct basalt flows. These basalts are interbedded with two (2) major and many minor sedimentary strata.

Locally significant hydrogeologic units occur in the Saddle Mountain and Wanapum Basalts, in the Mabton Interbed, and in the overburden where its depth is sufficient.

Municipal Water System

The City operates and maintains a municipal water system that provides potable drinking water to residents within the City limits and areas outside the City limits, but within the City's UGA. The extent of the water system, with respect to the wastewater collection and treatment system, can be seen in Figure 1-4 at the end of this Section. The municipal water system is supplied from treated surface water withdrawals from the McNary Pool of the

Columbia River to the Butterfield Water Treatment Plant and the West Pasco Water Treatment Plant. The City did have four (4) groundwater wells located in West Pasco off Road 108, which served as an emergency backup supply. The City last updated its Wellhead Protection Plan in 1999 before these well sources were abandoned. A copy of the City's Wellhead Protection Plan can be found in the City's 2010 Water Master Plan. At this time, the City has abandoned all emergency backup supply groundwater wells providing a source of supply to the City Water Utility.

The Water Filtration Division, which is part of the City's Public Works Department, operates two (2) water treatment facilities. This division is responsible for delivering quality drinking water to customers that meets and exceeds state and federal requirements.

The two (2) treatment facilities are defined as follows; the Butterfield Water Treatment Plant has a capacity of 29 million gallons per day (mgd) and is a conventional filtration plant (i.e., coagulation, flocculation, sedimentation and filtration) that uses chlorine as the primary disinfectant, and aluminum sulfide (alum) and polymer for coagulation. The West Pasco Water Treatment Plant came online in 2010 and has a capacity of six (6) mgd with an ultimate capacity of 24 mgd. This is a pressure membrane treatment facility with disinfection using bulk hypochlorite. Additionally, both Treatment Plants add fluoride to the finished water.

The City's water system consists of approximately 280 miles of watermain, ranging in size from less than six (6) inches in diameter up to 36 inches in diameter. The City follows the Criteria for Sewage Works Design for separation of potable water utilities from the sewer facilities. The water system is separated into three (3) pressure zones. In addition to the two (2) high service pump stations at the two (2) water treatment facilities, there are four (4) booster pump stations located within the water system. The City's current storage system consists of three (3) water storage reservoirs with a 13.5 million gallons (MG) combined storage capacity. The three (3) reservoirs are located throughout the service area in addition to the 0.485 MG clearwell at the Butterfield Water Treatment Plant and the 1.62 MG clearwell at the West Pasco Water Treatment Plant. The Water Distribution Division is responsible for maintaining and repairing the water system and works with the Water Treatment Plant to maintain water quality.

As shown in Figure 1-4 at the end of this section, the City's wastewater collection system services a similar area compared to the water system. The current difference in service area is that the City typically does not provide wastewater collection outside the City limits. The majority of the City's wastewater comes from customer's use of the municipal water system. Thus wastewater flows and municipal water demand follow a similar diurnal cycle throughout the year. Municipal water flows see a much higher demand in the summer associated with irrigation demands.

Sewer Basins

The existing and future service area was divided into 20 basins. The basins have been aligned by the two (2) WWTP lift stations to which they are conveyed, the Maitland and 9th and Washington Lift Stations. The immediate area associated with the Tri-Cities Airport runways have not been included within a specific basin since there is no current or projected wastewater flow in this area. These basins are shown on Figure 1-3 at the end of this Section and are described below:

East Sewer Basins

The basins that are on the east side of the City's collection system that flow into the Maitland Lift Station are summarized below.

South East Pasco Trunk

The South East Pasco Trunk Basin service area includes the area generally along East Ainsworth Street continuing southeast along the Burlington Northern Railroad and the Columbia River. The basin covers 1.97 square miles and is zoned Commercial and Industrial.

The South East Pasco Trunk Basin includes the single sewer trunk line serving the southeastern portion of the City. The collection system is comprised of a 30-inch diameter trunk sewer that collects flows from the Road 40 East Interceptor, conveying sewer flows to the Maitland Lift Station.

Road 40 East Interceptor

The Road 40 East Interceptor Basin service area includes the mostly undeveloped industrial areas north and south of I-182 within the City's UGA. North of I-182 it is bounded on the west by the Columbia East Industrial Area, on the northeast by the Dietrich Road and on the southeast by the Franklin Substation. It covers 2.47 square miles and is zoned Residential, Commercial and Industrial.

A 21-inch diameter interceptor sewer in Road 40 East extends north from the SE Pasco Trunk to I-182 and East Lewis Place, and will be extended to cross under I-182 in the future. The Commercial/Kahlotus Highway Lift Station will discharge into this interceptor that is collecting sewer flows from the area north of I-182 and the East Service Area Basin.

Sacajawea Park Road Interceptor

The Sacajawea Park Road Interceptor Basin service area includes the area generally along Sacajawea Park Road to the Snake River. It covers 1.79 square miles and is zoned Residential and Industrial.

This basin has a limited collection system, but joins with the Road 40 East Interceptor Basin at Sacajawea Park Road and Road 40 East. Through an inter-local agreement, the City has agreed to accept sewage flow from the Port of Walla Walla via a force main across the Snake River. This would tie into an existing manhole at Road 40 East, north of Sacajawea Park Road.

PSC5

The PSC5 Basin service area includes the area south of I-182 on both sides of Oregon Avenue, as well as north of Highway 12 and east of SR 395. This basin extends to East Lewis Street where it joins with PSC6 at North Main Avenue and East Lewis Street. It covers 1.22 square miles and is zoned Residential, Commercial and Industrial.

A 12-inch diameter sewer serves the Columbia East Industrial Area north of I-182 and east of SR 395. All collector sewers flow south to the east side of the Burlington Northern Railroad mainline tracks across from East Sylvester Street where they join with an 18-inch diameter interceptor on the east side of the Burlington Northern Railroad from the Hillsboro Interceptor Basin. It continues on as a 20-inch diameter interceptor until joining with PSC6 Basin at North Main Avenue and East Lewis Street.

PSC6

The PSC6 Basin service area includes a region south of I-182, which is generally bounded on the east side by South Wehe Avenue and on the west by Road 40 East. The basin's southern edge is East "A" Street. There is varied development, which includes residential and commercial areas. It covers 1.82 square miles and is zoned Residential, Commercial and Industrial.

The 6-inch to 10-inch sewer collection system flows to the southwest where it is collected in the 21-inch diameter interceptor that joins with PSC5 Basin and flows south to the Maitland Lift Station. The Pennie Avenue Lift Station serves a low area in the eastern portion of PSC6 Basin, along Pennie Avenue from East Adelia Street to East Alvina Street.

Hillsboro Interceptor

The Hillsboro Interceptor Basin serves the northeast corner of the City's collection system. It covers 4.34 square miles and is zoned Commercial and Industrial. This area includes the Pasco Processing Center (PPC) situated on the west of SR 395 and north of I-182. The food processors in this area utilize the Reuse Facility to manage process wastewater flows.
The basin area north of I-182 is served by an 18-inch diameter interceptor sewer that extends to East Hillsboro Road. A 15-inch sewer extends north along North Industrial Way to West Foster Wells Road. South of I-182 the 18-inch diameter interceptor runs down the east side of the Burlington Northern Railroad mainline tracks and joins with PSC5 Basin across from East Sylvester Street.

East Service Area

The East Service Area Basin is a future area outside the eastern edge of the city limits, including a portion outside of the City's UGA. It covers 2.58 square miles and is zoned Industrial. To serve this area the City is planning to construct a new lift station that would discharge into the Sacajawea Park Road Interceptor, which flows to the Maitland Lift Station.

NE Commercial Area

The NE Commercial Area Basin is a future area on the eastern edge of the City limits including a portion outside of the City's UGA. It covers 2.07 square miles and is zoned Industrial. To serve this area the City is planning to construct a future lift station, once development occurs, that will pump to Commercial Avenue within PSC5, which flows to the Maitland Lift Station.

West Sewer Basins

The basins that are on the west side of the City's collection system that flow into the 9th and Washington Lift Station are summarized below.

PRL

The PRL Basin serves the Pearl Street area of the City. This is a low area south of I-182 bounded generally by Court Street on the south, 22nd Avenue on the west, and 10th Avenue on the east. The development is mostly residential except for the commercial areas along Court Street. It covers 0.53 square miles and is zoned Residential and Commercial.

The basin is comprised of two (2) smaller sub-basins that collect wastewater through a collection of 12-inch sewers. The area west of North 15th Avenue is conveyed to the Pearl Street Lift Station located at Pearl Street and 14th Avenue. That lift station pumps the wastewater to a manhole located 400 feet to the east. From there, the wastewater flows down gradient on 11th, 10th and 8th Avenues to the PSC4 Basin.

PSC1

The PSC1 Basin serves the area along Road 36 that starts at the Desert Heights Subdivision and runs south along Road 36 to the trunk sewer crossing under the north end of the Blue Bridge. The northern part of this basin is bounded generally by the Tri-Cities Airport, SR-395 on the east and Yuma Drive on the west, with Burden Boulevard on the north. The southern boundary is the Columbia River. It covers 2.77 square miles and is zoned Residential, Commercial and Industrial.

The area of the basin north of I-182 is served by 8-inch and 10-inch sewer lines, which convey wastewater to the southeast toward Road 36. There is a low area in the northeast part of the basin, which is served by the Road 36 and Burden Lift Station. The lift station conveys wastewater through 1,350 feet of 6-inch force main along Road 36 to a manhole 217 feet south of Tusayan Drive where it enters the gravity sewer. The south portion of the basin is served by a 12-inch sewer along Road 36 where it joins with 36-inch Trunk Sewer Line under the north side of the Blue Bridge.

PSC2

The PSC2 Basin serves the Terminal Building at the Tri-Cities Airport, Columbia Basin College, Sun Willows Golf Course, The Village at Sun Willows and the hotels near the Tri-Cities Airport, all located north of I-182. South of I-182 this basin serves the businesses, homes and apartments on the east side of SR 395 to the Columbia River. This service area is generally bounded by SR-395 on the west and 22nd Avenue on the east. It covers 1.64 square miles and is zoned Residential, Commercial and Industrial.

On the east side of SR-395 the basin serves the Tri-Cities Airport by a 12-inch sewer line that runs south along North 24th Avenue. This part of the basin is comprised of 8-inch and 10-inch sewer lines, which convey wastewater to the 12-inch pipe in North 24th Avenue. The 12-inch sewer line flows from North 24th Avenue along West Sylvester Street to North 28th Avenue and then south through a 15-inch sewer line to the 36-inch Trunk Line at South 28th Avenue and Homestead Drive.

PSC3

The PSC3 Basin serves the area south of Court Street and between 15th and 20th Avenues to the Columbia River. It is mostly residential with commercial areas. It covers 0.93 square miles and is zoned Residential, Commercial and Industrial.

The basin is comprised of 8-inch to 12-inch sewers, which convey wastewater to the south and into the 36-inch Trunk Line and to the 9th and Washington Lift Station.

PSC4

The PSC4 Basin serves the downtown core from Tri-City Airport industrial area to the Columbia River. The basin follows along the west side of the Burlington Northern Railroad mainline tracks and is generally bounded on the west by 10th Avenue. There is varied development, which includes industrial, residential with commercial areas through the downtown area. It covers 2.29 square miles and is zoned Residential, Commercial and Industrial.

The Tri-City Airport industrial area is served by an 18-inch sewer line, which flows to the Navy Base Lift Station. This drainage area is collected at the Navy Base Lift Station and pumped south along 5th Avenue to a point just north of I-182. A 15-inch diameter interceptor sewer is installed under I-182 and runs south on 5th Avenue to the alley between Octave and Henry Streets; in this area the line serves customers between the railroad tracks and 7th Avenue. At the alley between Octave and Henry Streets, the pipe is routed west to 8th Avenue. At this point, flow from the PRL Basin enters the 15-inch interceptor. This interceptor sewer continues south on 8th Avenue to West Sylvester Street where it jogs over to 7th Avenue and flows south on 7th Avenue to the alley between West Clark Street and West Lewis Street; serving a large sector of the downtown business district. The size increases to 18-inch diameter interceptor at West Shoshone Street, flowing east to 5th Avenue and south on 5th Avenue to West "A" Street. At the 5th Avenue and West "A"

Street intersection, a 24-inch diameter trunk sewer continues south along 5th Avenue to West Washington Street and then east to the 9th & Washington Lift Station.

Broadmoor Boulevard Interceptor

The Broadmoor Boulevard Interceptor Basin service area is west of Broadmoor Boulevard and is bounded by the City limits on the north and Road 84 on the east. The basin's southern edge is Welsh and Massy Drives. The development varies between residential and commercial. It covers 1.81 square miles and is zoned Residential and Commercial.

The Broadmoor Boulevard Interceptor Basin joins with the Road 68 Interceptor Basin at Road 84 and Massy Drive. The collection system north of I-182 is comprised of 8-inch to 15-inch sewer line that feed into the 18-inch diameter interceptor that crosses under I-182. The 18-inch diameter interceptor is routed westward to Broadmoor Boulevard. The manhole at the intersection of Broadmoor Boulevard and Chapel Hill Boulevard includes a diversion that allows for flows to be directed toward the West Pasco Trunk Basin. At this time, flows are not diverted and pass through the manhole to the south where it goes into the 24-inch diameter trunk sewer on Welsh Drive. Flow continues to the southeast where it joins with the Road 68 Interceptor Basin and then the Road 84 Interceptor Basin.

Road 44 Interceptor

The Road 44 Interceptor Basin service area is generally along Road 44, north and south of I-182. North of I-182 the service area includes mostly residential development and is bounded on the west by Road 60 and Road 52. On the east, the boundary follows Road 44, except where PSC1 Basin extends westward to Yuma Drive, from Desert Drive to Burden Boulevard. It covers 2.38 square miles and is zoned Low-Density Residential and Commercial.

The Road 44 Interceptor is a 21-inch diameter interceptor that extends under the Franklin County Irrigation District (FCID) irrigation canal at I-182 to collect wastewater in the northern part of the basin comprised of 8-inch sewer line. South of I-182 the 21-inch interceptor is joined with flow from the Road 84 interceptor, which also includes flows from Road 100 Interceptor and Road 68 Interceptor. The 21-inch diameter interceptor joins with the line connected to the 36-inch West Pasco Trunk Sewer Line at West Sylvester Street.

Road 68 Interceptor

The Road 68 Interceptor Basin service area is generally along Road 68, north of I-182 and is bounded on the east by Road 60 and on the west by Road 84. The service area is mostly commercial development with some mixed residential. It covers 2.63 square miles and is zoned Residential and Commercial.

The Three Rivers Lift Station is located in Three Rivers Park. The lift station uses an 8-inch force main while pumping a distance of approximately 2,150 feet to a gravity manhole at the intersection of Three Rivers Drive and Westport Lane. The sewer then flows west to

Convention Drive and then to the south in Convention Drive. The Road 68 Interceptor Basin collects sewer flows through a network of 6-inch to 15-inch line and is served by a 15-inch diameter interceptor that crosses under I-182. The sewer then crosses through a field and joins with the Road 84 Interceptor east of Road 84 near the FCID irrigation canal.

Road 84 Interceptor

The Road 84 Interceptor Basin service area is generally along West Argent Road, from Road 90 to Road 60, and south of the FCID irrigation canal and I-182. It covers 1.14 square miles and is zoned Residential, Commercial and Industrial.
The Road 84 Interceptor Basin collects sewer in the Road 84 and West Argent Road area via the Road 84 and Argent Lift Station. The lift station discharges to a manhole at the intersection of West Argent Road and Road 72 to the 24-inch diameter trunk sewer. It joins with wastewater flows from the Broadmoor Boulevard Interceptor and Road 68 Interceptor Basins. The 24-inch diameter trunk sewer flows to the east along West Argent Road and joins with the Road 44 Interceptor Basin.

West Pasco Trunk

The West Pasco Trunk Basin service area is generally along West Sylvester Street starting at Road 44 and continues west along the Columbia River through the River Shore Estates subdivision. It covers 5.52 square miles and is zoned Residential, and Commercial.

The West Pasco Trunk Basin consists primarily of 24-inch and 36-inch diameter sewer trunk. The remaining collection system is comprised of 8-, 10- and 12-inch sewer lines. The basin collection system size is limited by the Riverview Area, which is in Franklin County and is currently surrounded by, but outside of, the current City limits. The Riverview Area is 3.73 square miles, see Figure 1-3 at the end of this Section for location and extent. Currently, the majority of homes in the Riverview Area have water provided by the City’s system. Most homes in this area are sewered by septic tank and drain field systems. This area is currently included in the City’s UGA.

North Court Street

The North Court Street Basin is a future service area on the western edge of the City’s UGA, between the existing City limits and the UGA. It covers 3.27 square miles and is zoned Low-Density Residential, Mixed Residential and Mixed Residential/Commercial. This is a future service area that is planned for development between Convention Drive and the Columbia River.

Northwest Service Area

The Northwest Service Area Basin is outside the northwest edge of the City’s UGA, though it is planned for inclusion in the 20-year planning evaluation. It covers 5.40 square miles and is zoned Low-Density Residential.

Summary of Collection System Facilities

The City's wastewater collection system consists primarily of manholes, gravity pipelines, lift stations and force mains that convey wastewater to the WWTP. For the most part, the gravity pipelines convey wastewater from the residential and commercial areas and route them to interceptors and large sewer trunks, which drain to the WWTP. Due to the varied topography in the City, several localized and regional lift stations are required to convey sewage to the WWTP. The City's two (2) primary lift stations (Maitland and 9th and Washington) are located just outside the WWTP and convey sewage directly to the plant.

Gravity Piping Collection System

The collection system is comprised of pipes between 6 and 36 inches in diameter. The oldest portion of the collection system, which is 50 to 100 years old, is in the downtown area and comprised of clay pipe and brick manholes that have not been replaced. As the collection system has expanded over the past 20 to 30 years, the newer piping is PVC with concrete manholes for pipes 18 inches and smaller. The larger trunk sewer pipes are typically concrete with concrete manholes. Based on information provided by the City, Table 1-2 summarizes the collection system's gravity pipe. The approximate percentage of the different material types is over 60 percent polyvinyl chloride (PVC), over 30 percent concrete, seven (7) percent clay and the rest being a small portion of asbestos cement (AC) and ductile iron (DI).

Table 1-2
Gravity Pipe

Diameter (inch)	Total Length (miles)	Percent of Total Length
8 and smaller	169	69%
10	20	8.1%
12	20	8.3%
15	8.3	3.4%
16	0.07	0.03%
18	9.0	3.7%
20	0.22	0.09%
21	2.2	0.91%
24	5.9	2.4%
30	4.2	1.7%
36	5.0	2.1%
Total	**243.3**	**100%**

Lift Stations and Force Mains

The City's wastewater collection system currently utilizes 10 lift stations of various sizes. The majority of stations are submersible type stations with two (2) pumps for redundancy. Two (2) additional lift stations have been included in the summary, one (1) is temporary and the second came online in 2013 during the development of this Plan. Figure 1-2 at the end of this Section shows the lift station locations throughout the system, which are summarized in Table 1-3. The pumping capacity; total and firm, for each of the lift stations is also shown in Table 1-3.

Table 1-3
City of Pasco Lift Station Summary

Name	Type	Wet Well (diameter)	No. of Pumps	Total Horsepower	Pumping Capacity (gpm)		Level Control Type	Alarm System	Standby Power Capability
					Total	Firm[4]			
Airport	Submersible	72-inch	2	15	300[3]	150	Pressure transducer	Dialer	35 kW Genset
Road 36 and Burden	Submersible	72-inch	2	40	750	375	Float	Dialer	60 kW Genset
Navy Base	Submersible	96-inch	2	30	500	250	Pressure transducer	Dialer	60 kW Genset
Pearl Street	Dry Pit (Split)	192-inch	2	20	1,600	800	Bubbler	Dialer	Portable
Pennie Avenue	Submersible	60-inch	2	4	170	85	Float	Dialer	20 kW Genset
Maitland Avenue	Dry Pit	(2) 144-inch	3	225	7,275	4,850	Pressure transducer	Dialer	Dual Feed from PUD and Portable
9th and Washington	Submersible/ Dry Pit	204-inch	4	338	10,400	6,800	Pressure transducer	Dialer	300 kW Genset
Road 84 and Argent	Submersible	72-inch	2	15	880	440	Pressure transducer	Dialer	60 kW Genset
Rivershore Estates	Submersible	72-inch	2	10	880	440	Pressure transducer	Dialer	25 kW Genset
Three Rivers	Submersible	96-inch	2	30	1,200	600	Pressure transducer	Dialer	80 kW Genset
Capital Avenue[1]	Submersible	48-inch	1	N/A	50	0	Manual	Manual	Portable
Commercial/ Kahlotus[2]	Submersible	(2) 144-inch	3	71	1,959	1,086	Pressure transducer	Dialer	Portable

[1] *Temporary Lift Station*
[2] *Lift Station came online in 2013 and wet well size is for planned build-out*
[3] *Flow rate based on lift station run time evaluation*
[4] *Firm capacity represents the maximum pumping capacity of the pumping station with the largest pump out of service.*

The two (2) main lift stations, Maitland and 9th and Washington, convey all wastewater flows to the City's WWTP. The Maitland Lift Station serves the eastern side of the City and the 9th and Washington Lift Station serves the western part of the City. The remaining lift stations serve localized low areas that cannot easily be conveyed by gravity.

The Capital Avenue Lift Station is a temporary lift station that will be expanded into a permanent lift station once development occurs north along Capital Avenue. Currently, the City maintains a single pump to drain a manhole as surface water accumulates, there are no service connections to this portion of the system at this time. The Commercial/Kahlotus Lift Station came online in 2013 and is for serving the industrial area northeast of the City.

Table 1-4 summarizes the force mains of substantial length and their contributory lift stations.

Table 1-4
Force Mains

Contributing Lift Station	Force Main Diameter (inch)	Force Main Length (feet)
Airport	8	650
Road 36 and Burden	6	1,350
Navy Base	12	1,609
Pearl Street	8	527
Pennie Avenue	8	466
Maitland	24	2,119
9th and Washington	20	4,542
Road 84 and Argent	6	4,015
Rivershore	6	1,259
Three Rivers	8	2,140
Capital Avenue	4 and 8	1,343
Commercial/Kahlotus	4 and 8	5,600

Collection System Performance

The performance history of the collection system has been good.

The Road 36 and Burden Lift Station, as well as the Pearl Street Lift Station, have experienced high levels due to an auto dialer failure and the lack of a high-level alarm. These conditions have been corrected and the events did not result in an overflow condition at manholes or customer homes.

Interties and Services Agreements

Reuse Facility

The City and the Port of Pasco, with support from the Tri-Cities Industrial Development Council, launched the Pasco Initiative in the early 1990s. The City acquired 1,600 acres of land northeast of Pasco, 1,200 acres of which are under center pivot irrigation, for disposal of treated reuse waste from food processors. The City has owned and operated the Reuse Facility and collection system since 1995. It was designed to manage process wastewater from a variety of vegetable processing facilities. It currently receives process wastewater from four (4) processors; no sanitary wastewater is discharged into the system. Three (3) processors (Pasco Processing, Twin City Foods and Reser's Foods) are located within the PPC that is just north of the City and along SR 395, and one (1) processor (Bybee Foods) is located on the eastern boundary on Commercial Avenue. The City provides fresh water to all of the facilities for processing. Ecology currently permits all National Pollutant Discharge Elimination System (NPDES) permitted discharges to the City's Reuse Facility and each user pretreats the wastewater prior to discharging to the City's system (e.g., screening; pH adjustment).

The reuse collection system includes the centrally located Foster Wells Lift Station where wastewater is screened and then pumped approximately two (2) miles east to the storage pond/irrigation pump site. The Foster Wells Lift Station includes an emergency overflow to the City wastewater collection system. This overflow has not been used since it was constructed. Additionally, wastewater from Bybee Foods is screened and pH adjusted on-site, and then pumped directly to the City's storage pond/pump site.

During the growing season, the reuse wastewater effluent is directed to the irrigation pump station, which delivers it to the center-pivot sprayfield system. Wastewater flow in excess of the crops requirement is diverted to a lined and aerated five (5) MG equalization basin. During the winter, the entire wastewater stream from all of the users is sent to a lined and aerated 115 MG storage pond. Wastewater in the winter storage pond is blended with the main waste stream during the growing season until the pond is completely emptied. Supplemental fresh water for irrigation is provided by 11 wells. The facility operator controls the amount of fresh water blended with the process wastewater. Backflow preventers have been installed at each well to prevent contamination by the wastewater.

Port of Walla Walla

The City has entered into an agreement with the Port of Walla Walla to accept 360,000 gallons per day of wastewater. The Port of Walla Walla is designing a force main that will be installed via horizontal directional drill under the Snake River and connect into the City's collection system in Road 40 East. At this point, wastewater will flow by gravity into the City's collection system.

WWTP Influent Characterization

Historical flow and load data from years 2006 through 2011 were used to establish the existing influent wastewater characteristics (flows, loadings and peaking factors). In January 2009, the rotary screen thickener filtrate was rerouted to the Maitland Lift Station to eliminate foam buildup in the solids handling building. This caused an increase in the observed influent constituent concentrations, but the increase is not due to altered wastewater from the service area. For this reason influent characterizations are shown in two (2) tables, 1-5 and 1-6.

The annual average values are the typical daily loads that the plant is processing. The maximum month value is the highest monthly average. The peak day value is the highest daily average in the year. The peak hour value is the highest value of hourly averages. The peak instantaneous is the highest recorded value during the dataset. The average annual, maximum month, peak day, peak hour and peak instantaneous values are measures of the variability of the wastewater characteristics. By considering the variability over different time measures, the impacts on various unit processes in the plant can be better characterized.

Table 1-5
2006 to 2008 Influent Wastewater Characterization

Load	Units	Annual Average	Maximum Month	Peak Day
Flow	mgd	3.22	3.62	4.01
Flow Peaking Factor	--	1	1.12	1.25
BOD[1]	lb/day	6,344	8,041	10,050
	mg/L	*236*	*266*	*301*
TSS[1]	lb/day	6,397	8,022	22,306
	mg/L	*238*	*266*	*667*
Ammonia[1]	lb/day	847	995	1,146
	mg/L	*32*	*33*	*34*
Total Phosphorus[2]	lb/day	NA	NA	NA
	mg/L	*NA*	*NA*	*NA*
Temperature - High	°C	19.6	25.3	26.1
Temperature - Low	°C	19.6	14.6	12.8

1 Concentration (mg/L) is a calculated value based on load (lb/day) and flow
2 Phosphorus levels not measured until July 2010

Table 1-6
2009 to 2011 Influent Wastewater Characterization

Load	Units	Annual Average	Maximum Month	Peak Day	Peak Hour	Peak Instantaneous
Flow	mgd	3.83	4.27	5.15	7.27[1]	8.68[1]
Flow Peaking Factor	--	1	1.11	1.34	1.90	2.27
BOD[2]	lb/day	8,820	10,163	13,364	--	--
	mg/L	*276*	*285*	*311*	--	--
TSS[2]	lb/day	9,310	11,724	27,669	--	--
	mg/L	*291*	*329*	*644*	--	--
Ammonia[2]	lb/day	1,535	1,930	2,617	--	--
	mg/L	*48*	*54*	*61*	--	--
Total Phosphorus[2,3]	lb/day	266	306	324	--	--
	mg/L	*8.3*	*8.6*	*7.5*	--	--
Temperature - High	°C	19.8	25.0	26.1	--	--
Temperature – Low	°C	19.8	14.9	12.7	--	--

1 *Based on data from December 2010 to October 2011*
2 *Concentration (mg/L) is a calculated value based on load (lb/day) and flow*
3 *Phosphorus levels not measured until July 2010*

Wastewater Treatment Facilities Overview

The City's collected wastewater is treated in a Class III WWTP facility (WAC 173-230-140; *Classification of Wastewater Treatment Plant*) that has been built in stages over the past 60 years. After treatment, the effluent from the plant is discharged to the Lake Wallula reach of the Columbia River.

In 1954, the City constructed its first wastewater treatment facility. This primary treatment facility included a horizontal grit channel, primary clarification, an effluent parshall flume, and an outfall pipeline to the Columbia River. Solids collected in the primary clarifier were pumped to a sludge digestion complex with one primary and one secondary digester. The digested sludge was conveyed to sludge drying beds for dewatering and storage prior to disposal.

Secondary treatment was added in the early 1970s with the addition of a trickling filter, associated clarifier and chlorine disinfection facilities. The 1970 modifications increased the WWTP's design population equivalent to 30,000.

In the mid to late 1990s, the WWTP's design capacity was increased with the addition of a new headworks building (screenings and grit removal), activated sludge basins, two (2) secondary clarifiers, a new primary digester and UV disinfection. At the time of the design of these facilities, the City's outfall was an end of pipe discharge and the improvements that were designed based on the presumed need to nitrify to avoid the detrimental effects from ammonia discharges to the aquatic biota in the Columbia River. However, a subsequent installation of a multi-port diffuser and extension of the outfall location in the river improved the mixing of the effluent and negated the need for an effluent ammonia limit in the City's discharge permit.

Additional capital projects completed at the WWTP since the 1990 upgrades include new drying beds, digested solids thickening facilities, a dewatered solids storage building, a second primary digester and an upgrade of the UV modules. Most recently (2012), the City completed upgrades to the aeration basin air system (new blowers and controls) and the headworks building (new screens and washer/compactors). Presently, the City is in the process of self installing additional screw presses to increase digested sludge dewatering capacity.

The WWTP is presently operated to meet the City's NPDES permit while also minimizing nitrification in the aeration basins in order to reduce the plant's energy consumption.

Treatment Processes

The existing WWTP processes can be grouped into three (3) main treatment categories that serve specific purposes: primary treatment, secondary treatment and solids treatment. All of the treatment categories involve multiple unit processes that carry out distinct functions necessary for the treatment of the City's raw wastewater. The following paragraphs provide a brief description of the function of each treatment category and its associated unit processes. Figure 1-5 is a schematic representation of the various unit processes that make up the City's existing WWTP.

Primary Treatment

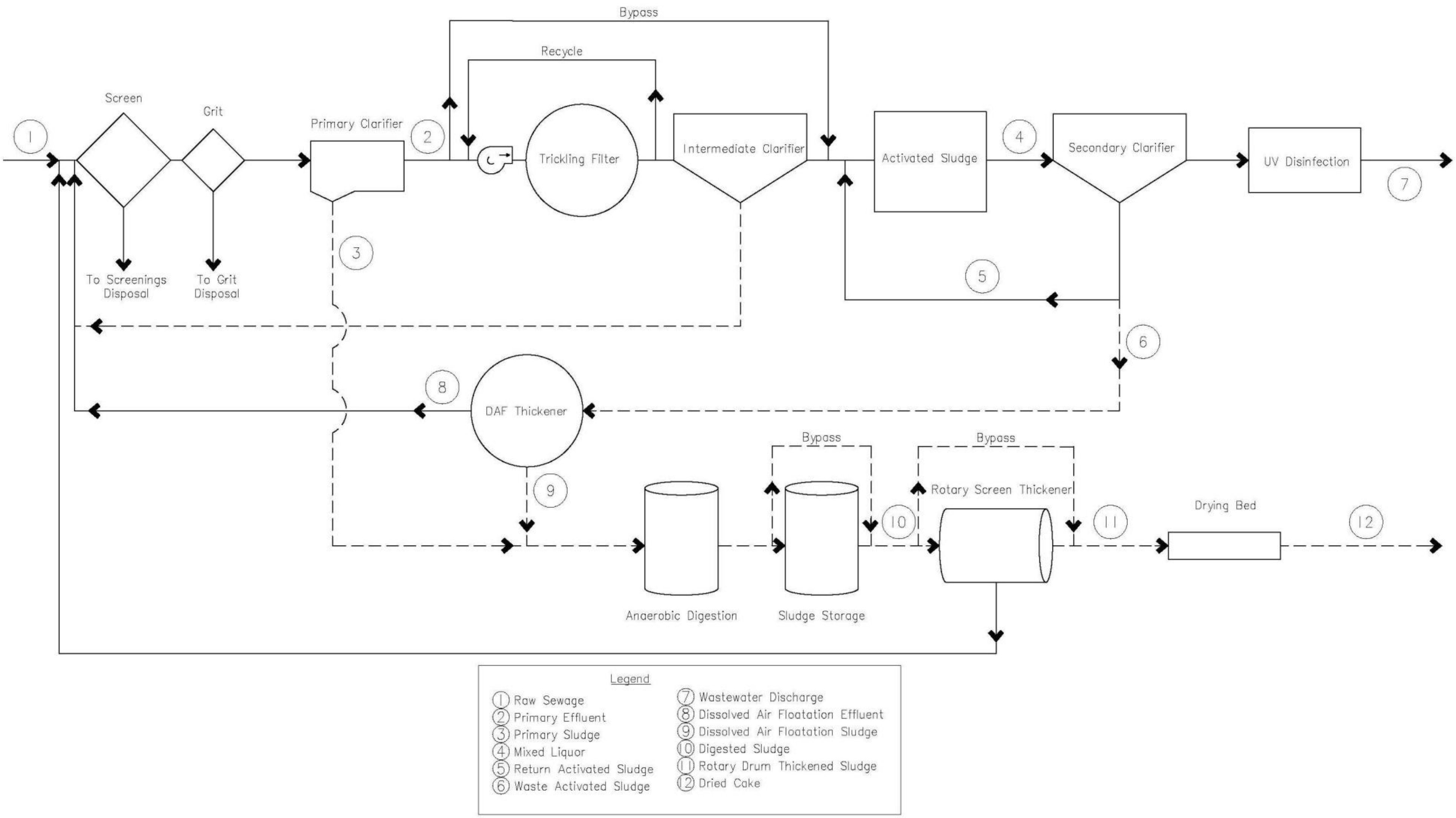
The role of primary treatment is to remove solids from the waste stream through primarily physical processes. Primary treatment at the WWTP consists of screening, grit removal and primary clarification.

Headworks Facility

The headworks facility houses three (3) 36-inch wide mechanical influent screens, a screenings conveyance system, two (2) washer/compactor units and a dumpster system for screening disposal. During normal operation, all the flow is directed to the two (2) newest mechanical screens. When one (1) of these perforated plate screens is offline or not functioning properly, all or some of the wastewater can be bypassed to a third reciprocating rake bar screen. The collected screenings are then washed and the compactor auger transfers the solids from the screen room to dumpsters. Grit, rags and screenings are disposed of as solid waste at the local landfill.

The two (2) new 8-milimeter perforated plate mechanical screens, each have a stated peak flow rating of 10.3 mgd.

Figure 1-5
City of Pasco WWTP Schematic



Grit Removal

After screening, the wastewater is conveyed to two (2) 10-foot diameter grit chambers, each rated for up to 7.2 mgd of peak flow. Grit is removed in these chambers through the creation of a vortex flow pattern that allows the grit to settle out while the effluent exits at the top. Removal of sand and grit from the wastewater serves to protect downstream equipment from accelerated wear and prevent reduced digestion capacity due to grit accumulation.

Primary Clarifier

From the grit chambers, wastewater flows into two (2) 148-foot long by 18.5-foot wide rectangular primary clarifiers that are approximately eight (8) feet deep. The primary clarifier is intended to settle, concentrate and remove organic solids from the waste flow. Because biochemical oxygen demand (BOD) in wastewater exists in both soluble and particulate form, a substantial amount of BOD can be removed during this process. This reduction in total suspended solids (TSS) and BOD decreases the load to (and increases the capacity of) the secondary treatment processes. The collected primary clarifier solids (sludge) are pumped directly to the digesters along with the waste solids produced in the secondary treatment process.

From the primary clarifiers, primary effluent flows through a junction box that splits flow between the trickling filter and the aeration basins for the start of secondary treatment.

Secondary Treatment

The secondary treatment process is the central part of the treatment facility and the most complex. Secondary treatment is defined by the degree of treatment achieved, rather than the actual processes employed. The role of secondary treatment is to remove dissolved organics, nutrients, solids and pathogens from the wastewater stream using biological, physical and chemical means. The complexity of the process arises from the many different variables and parameters that separately, and jointly, affect system operation and the final effluent quality. The secondary process employed at the Pasco WWTP incorporates a trickling filter, intermediate clarifier, aeration basins, secondary clarifiers and UV disinfection system.

Within the trickling filter and the aeration basins, microorganisms remove organic substrate from the wastewater. These microorganisms require oxygen to breakdown the organics within wastewater and grow new cell mass. When the majority of the BOD has been converted into cell mass, the wastewater flows to the secondary clarifiers for the removal of these biological solids from the liquid waste stream. Finally, the liquid is disinfected using UV radiation prior to discharge to the Columbia River.

Trickling Filter

The trickling filter is a 120-foot diameter, 8-foot deep, fixed-film biological reactor using rock as the substrate for biomass growth. A portion of the primary clarifier effluent and recycled trickling filter underflow is continuously distributed on the trickling filter by a hydraulically driven rotary distributor. Treatment occurs as the wastewater flows over the film of biomass on the rock. The trickling filter reduces BOD through the growth of the bacteria in the film. The bacterial biofilm grows on the rock, ultimately sloughs off and then regrows again.

Intermediate Clarifier

The 85-foot diameter circular intermediate clarifier removes solids from the trickling filter effluent. The intermediate clarifier effluent mixes with the primary clarifier effluent that is bypassed around the trickling filter before being treated further in the aeration basins. The solids removed in the intermediate clarifiers are pumped back to the front of the plant.

Aeration Basins

Within the aeration basins, microorganisms grow in suspension and metabolize the BOD in the wastewater. The mass of microorganisms grown in suspension is typically called mixed liquor. The City's existing WWTP has two (2) aeration basins that follow the primary clarifier and trickling filter and are each 50 feet wide, 100 feet long and 16 feet deep with a total combined volume of 1.2 MG. The first nine (9) feet of each aeration basin is described in the original design drawings as a selector zone. This zone and the subsequent three (3) aeration zones per basin are provided with a grid of submerged 9-inch membrane disc fine bubble diffusers. Presently, only one (1) aeration basin is typically used at a time. The diffusers are supplied air by blowers located in an adjacent blower building.

The City recently upgraded these facilities to improve energy efficiency and operations. Two (2) new turbo blowers were added to the existing multi-stage centrifugal blowers to improve the aeration system efficiency and turn-down. The two (2) new turbo blowers are each capable of delivering between 1,925 to 3,850 standard cubic feet per minute of air. In addition to the modifications to the blower building, the City installed modulating air zone control valves and dissolved oxygen (DO) monitoring equipment to allow automated and optimized DO control in the basins. As part of this work, the existing diffusers in the basins will be provided with new membranes and retainer rings.

When the aeration basins are operated in a mode that also removes ammonia (nitrification), the pH of the wastewater can be adversely impacted. To address this, a lime silo and feed system were installed at part of the 1990 improvements. When needed, lime is added downstream of the primary clarifier for pH control.

Secondary Clarifiers

Two (2) 95-foot diameter, 14-foot deep circular secondary clarifiers are used to separate the microorganisms, typically referred to as activated sludge or biosolids, from the treated wastewater. Presently, only one (1) secondary clarifier at a time is typically used. Both clarifiers contain center feed and suction withdrawal mechanisms and are equipped with an aluminum chlorohydrate feed system used to improve settling and solids removal, when needed.

The majority of the settled activated sludge is returned to the aeration basin to maintain the microorganism population required in the aeration basins. The rate of this return flow, the return activated sludge, is adjusted by City operations staff on a daily and seasonal basis in order to keep hydraulic residence time in the clarifier in an optimal range. The excess activated sludge, waste activated sludge (WAS), is conveyed to the dissolved air flotation thickener (DAFT) prior to digestion and disposal.

UV Disinfection

UV radiation is used to disinfect the treated wastewater prior to discharge to the Columbia River. The UV disinfection system installed in 1998 has since been upgraded to address system performance problems. The existing disinfection system is comprised of two (2) UV channels with a total of 12 vertical lamp modules designed to treat a maximum flow of 23.2 mgd. The system measures flow rate and transmittance to determine the number of UV modules that must be on. Since the upgrades, wastewater effluent measurements for fecal coliform count have been consistently within permit limits.

Effluent Flume

A flow measurement manhole is provided downstream of the UV disinfection system. This facility is used for plant flow reporting and is equipped with a 2-foot Parshall flume and ultrasonic flow measurement device connected to the plant SCADA system.

Discharge Outfall

The effluent is discharged from the facility via a 24-inch multiport diffuser outfall into the Columbia River. Leaving the plant site, the outfall follows a southerly line, defined by Gray Street, continuing approximately 900 feet offshore from the north bank and terminates at a diffuser that is approximately 30 feet below the water surface. The outfall has three (3) 8-inch diameter diffuser ports and is 50 feet long. At this location the river flows west to east southeast.

Solids Treatment

The role of the solids treatment systems are to thicken, treat and dispose of the biological and waste solids produced at a WWTP. A summary of the unit processes used by the City for this function are described below

Dissolved Air Flotation Thickener

WAS from the secondary clarifiers is pumped to a 10-foot diameter DAFT prior to digestion in the anaerobic digesters. The WAS solids coming from the secondary clarifiers are thickened from a concentration of 0.5 to one (1) percent to a solids content ranging from two (2) percent to four (4) percent. With only one (1) DAFT unit, this system has no redundancy and the unthickened WAS can be bypassed directly to the digesters.

Anaerobic Digestion

In this treatment process, the organic material in the solids is digested and converted biologically under anaerobic conditions into methane and carbon dioxide gas (digester gas). The digester gas is then collected and a portion is directed to the boiler to heat the digester to approximately 37°C (99ºF), which is in the mesophilic temperature range. Any unused gas is flared off to atmosphere.

The benefits of anaerobic solids digestion are the reduced volume of dewatered biosolids when compared to alternative digestion processes, potential use of methane for energy production, and a stabilized end product. Reduction in solids leads to decreased sludge handling costs. A stabilized product with reduced pathogen levels can be disposed of at properly permitted land application facilities or used in other beneficial ways that might reduce hauling costs.

The City's anaerobic digestion system has been added to, and modified, several times since initial construction. Currently, there are two (2) 66-foot diameter primary anaerobic digesters that are actively used to treat the solids. The two (2) original 42-foot diameter anaerobic digesters (1954) have been modified and no longer provide anaerobic treatment. One (1) is used for digested sludge storage, and the second has been modified for gas storage. To accommodate gas storage, the original roof has been replaced with a two (2) membrane system. The outer member is held in place by cables and remains in a fixed position. The inner membrane moves with the digested gas and provides variable volume storage.

Rotary Screen Thickener

The digested sludge is thickened in the rotary screen thickener from a concentration of approximately two (2) percent to a range of eight (8) to nine (9) percent. Prior to thickening, a polymer is added to improve flocculation and thickening. The conditioned sludge flows to the rotating screen where flocculated solids are separated from the water.

Sludge Drying and Disposal

Digested sludge (thickened and non-thickened) is spread, dewatered and stored in onsite sludge drying beds. Drying beds are individual cells with an asphalt floor and a concrete containment wall around the perimeter. Sludge is pumped to the individual beds and then rotated on a regular basis to ensure consistent drying. These beds provide just over four (4) acres of available space for dewatering digested sludge to high a solids concentrations prior to disposal. Dry solids are moved into the WWTP sludge storage building and trucked on an annual basis to local private properties permitted for land application under a permit issued by Ecology's Waste 2 Resources Program. The permit includes a condition requiring the City to properly handle residual solids so that no leachate enters ground or surface water.

NPDES Discharge Permit

The Federal Clean Water Act requires municipal facilities that discharge treated wastewater into waters of the United States to obtain a NPDES permit. The permit establishes maximum pollutant concentrations and loads allowed in the effluent discharge stream. The Pasco WWTP is regulated by NPDES Permit WA-004496-2, which allows discharge of treated wastewater to the Columbia River. Table 1-7 summarizes the monthly effluent permit limitations, but does not list other monitoring requirements included in the permit. The current 6-year permit cycle runs to June 30, 2015.

Table 1-7
NPDES Permit Limits and Requirements

Parameter	Average Monthly Limits	Average Weekly Limits	Comments
BOD	1,131 lbs/day	1,696 lbs/day	
	30 mg/l	45 mg/l	
	85% removal		
TSS	1,131 lbs/day	1,696 lbs/day	
	30 mg/l	45 mg/l	
	85% removal		
Fecal Coliform Bacteria	200 colonies/100 ml	400 colonies/100ml	Geometric mean
pH	Daily minimum is equal to or greater than 6.0 and the daily maximum is less than or equal to 9.0.		Instantaneous minimum or maximum

WWTP Performance

The WWTP generally produces an excellent quality effluent, demonstrating the plant's ability to achieve and maintain compliance with their discharge permit. Table 1-8 summarizes the WWTP's effluent quality since 2009 versus the monthly average permit limits.

Table 1-8
2009 to 2011 Effluent Quality

Parameter	Units	Actual	NPDES Permit Limit		Comments
BOD	mg/L	19	30	average	Meets Limit
TSS	mg/L	19	30	average	Meets Limit
Fecal Coliform	Colonies/ 100 ml	57	200	geomean	Meets Limit
pH	pH	6 to 7.6 (6.8 avg)	6 to 9	min/max	Meets Limit

Since the current NPDES permit became effective on July 1, 2010, the WWTP has violated its permit only three times (December 2010, February 2012, and February 2013). The specific permit violations experienced and an explanation of each are provided below.

December 2010 Violations

- Average Month TSS Loading
- Average Month TSS Concentration
- Average Month TSS Percent Removal
- Average Week TSS Loading
- Average Week TSS Concentration
- Average Month BOD Loading
- Average Month BOD Concentration
- Average Month BOD Percent Removal
- Average Week BOD Loading
- Average Week BOD Concentration

These violations were the result of poor clarifier performance that was exacerbated by a change in aeration basin operation. Since this time, the City has reviewed the cause of the problem and implemented corrective operational measures.

February 2012 & 2013 Violations

There was a discharge in late February of 2012 of non-disinfected wastewater of approximately 75,000 gallon into the Columbia River. A second incident of approximately

300,000 gallon discharge occurred in early Feb of 2013 of non-disinfected wastewater. Both discharge violations were caused by power loss to the UV Facility.

Receiving Water Characterization

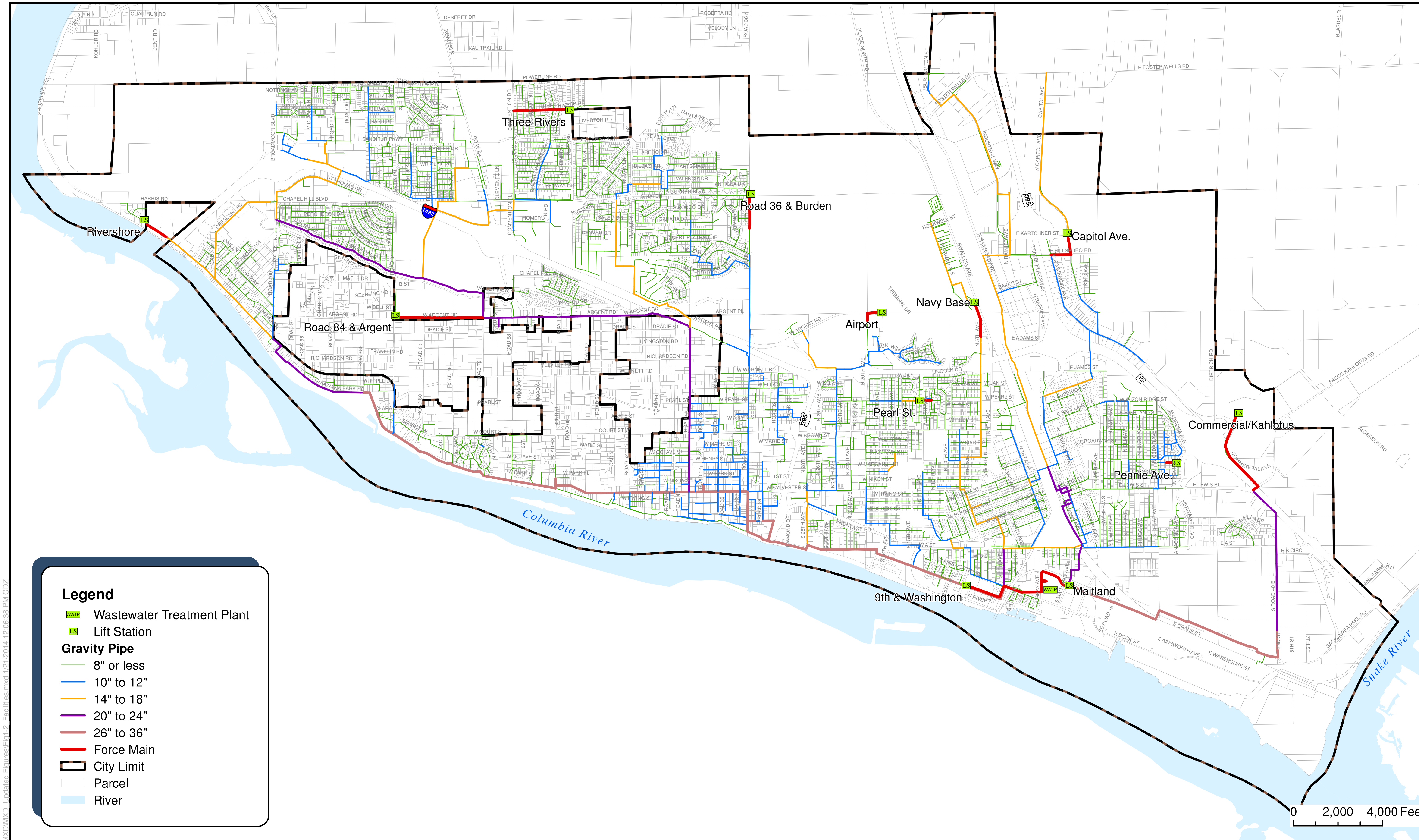
The Columbia River is the receiving water for the City's effluent and has other nearby point source outfalls, which include the City of Kennewick WWTP and the City of Richland WWTP. Table 1-9 includes the ambient background data upstream from Pasco from Environmental Assessment Program Monitoring Station 36A070 on the Columbia River, near Vernita. The water quality immediately upstream of Pasco will vary from that shown due to the Richland WWTP as well as the Yakima River discharge into the Columbia River.

Table 1-9
Ambient Background Data

Parameter	Value Used
Temperature (highest annual 1-DADMax)	21°C
Temperature (**some water bodies have specific temperature criteria, as assigned in Table 602)	See Note 1
pH (Maximum/Minimum)	8.45/8.03
DO (Maximum/Minimum)	14.08/9.38 mg/L
Total Ammonia-N	0.01 mg/L
Fecal Coliform (Maximum)	11/100 mL
Turbidity	1.2 NTU
Hardness	65 mg/L as CaCO3
Lead	0.1 µg/L
Copper	0.67 µg/L
Zinc	5 µg/L
7Q10 low flow near Pasco, WA (see Note 2 & 3)	53,200 cfs
30Q5 low flow near Pasco, WA (see Note 2 & 3)	63,800 cfs

Notes:

1. *From Washington-Oregon border (river mile 309.3) to Priest Rapids Dam (river mile 397.1). Temperature shall not exceed a 1-DMax of 20.0°C due to human activities. When natural conditions exceed a 1-DMax of 20.0°C, no temperature increase will be allowed which will raise the receiving water temperature by greater than 0.3°C; nor shall such temperature increases, at any time, exceed t = 34/(T + 9)*
2. *Based on combined flow data from USGS 12472800(Columbia River downstream of Priest Rapids) and USGS 12510500 (Yakima River at Kiona, WA) monitoring stations.*
3. *Only data from 1964 to present was used to account for influence of Columbia River Reservoir System.*



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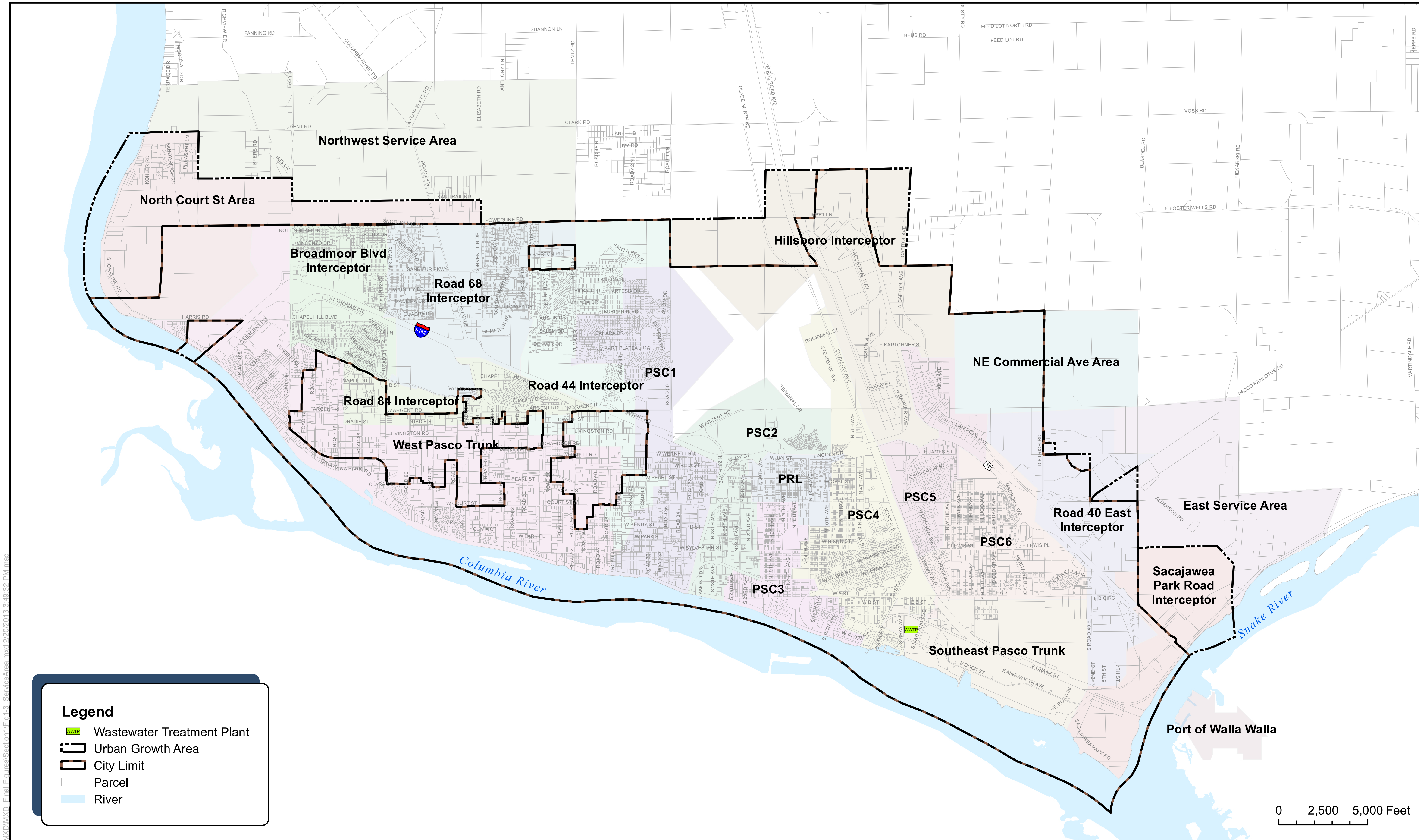
CITY OF PASCO

Comprehensive Sewer Plan

Figure 1-2
Wastewater Facilities

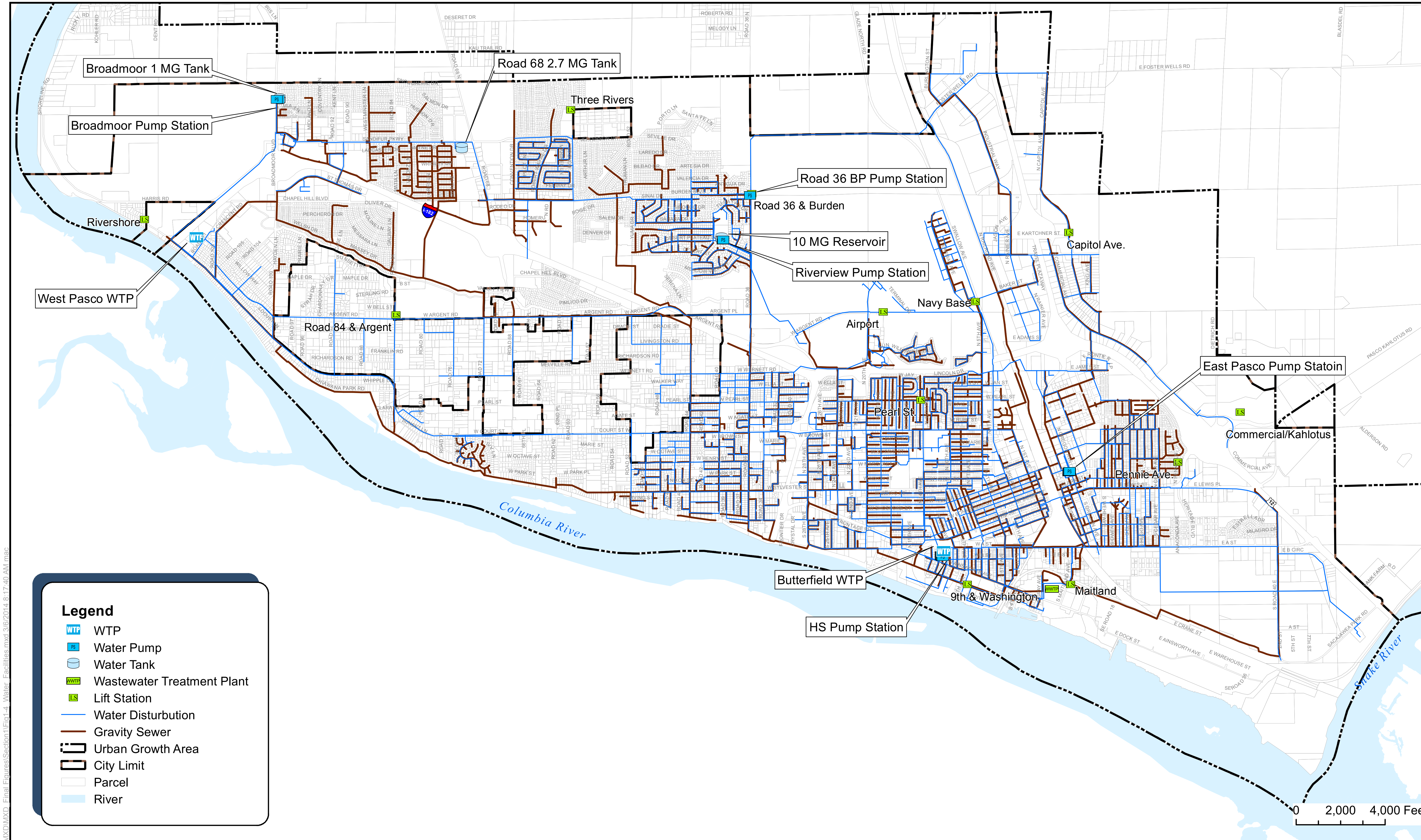
February 2013 11-1261



Comprehensive Sewer Plan

Figure 1-3
Sewer Service Area and Sewer Basins

February 2013 11-1261



Comprehensive Sewer Plan

Figure 1-4
Water and Sewer Facilities

February 2013 11-1261

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Section 2

SECTION 2
FUTURE CONDITIONS AND FUTURE WASTEWATER FLOW PROJECTION

This section reviews the conditions that will impact the development and management of the City of Pasco's (City) wastewater collection and treatment systems. These conditions include future wastewater flows and loading projections and future regulatory requirements and permit limitations.

Future Wastewater Flows

This section defines the methodology and assumptions for the development of the future wastewater flows within the City's current and future service areas. The development of future population growth and associated wastewater flow projections are fundamental building blocks for the City's Comprehensive Sewer Plan update efforts. Of importance is understanding where in the system growth will occur allowing the City to determine future wastewater infrastructure needs. This process also determines if pipelines and lift stations are adequately sized for specific portions of the system. To develop projected wastewater flows the following information has been reviewed.

- Current and future service area boundaries
- City Comprehensive Plan and City Comprehensive Water System Plan for location based population and employment information projections
- Draft 2011 - 2030 Regional Transportation Plan
- The delineation of the major sewer basins
- Winter time water usage by customer location
- Winter time water production records
- Sewer flow metering at multiple locations in the system
- Wastewater Treatment Plant (WWTP) based flow records

To determine the location and rate of future growth within the City's service area, regional planning information was reviewed. Future growth planning is then not limited to a simple annual percentage rate growth projection developed from a historical perspective. The regional planning documents have estimated how economic factors, socio-economic factors and regulatory mandates might impact where future growth might occur.

Service Population

The population for the City in 2011 was 61,465, which is based on the 2010 Census and 2008 Comprehensive Plan growth estimates. The estimated population served by the wastewater system was established from the number of equivalent units at 50,839. This difference represents the number of households within the city Limits that are currently on private on-site drainfield systems. These households are predominantly located throughout the western part of the City. Through annexation, residents with existing septic systems are allowed to defer connection to the City's sewer system until the system fails.

Using the medium-range growth scenario, the County population will reach 110,192 by 2030, based on projections developed by the state Office of Financial Management (OFM). The 2011-2030 Regional Transportation Plan by the Benton-Franklin Council of Governments, projects the City's population will be 87,752 by 2030, which represents 79 percent of the OFM projection. To maintain a consistent growth rate, it is assumed that 79 percent of future population increases in Franklin County will occur within the City Urban Growth Area (UGA). This is a population increase of 27,971 over the 20-year period planning horizon. Table 2-1 shows the OFM population projections for Franklin County.

Table 2-1
OFM Population Projections for Franklin County

Year	Low	Medium	High
2010	64,742	69,992	76,396
2015	72,582	80,424	90,135
2020	79,853	90,741	104,352
2025	86,402	100,760	118,822
2030	92,010	110,192	133,168

The City's 2008 Comprehensive Plan growth projections are based on the medium OFM population projections for Franklin County. Based on these projections, Table 2-2 presents the population and growth rates within the City for the planning horizon.

Table 2-2
City of Pasco Population Projections

Year	Pasco UGA Population	Average Yearly % Growth
2010	59,781	
2011	61,465	2.82%
2031	89,337	1.89%
2061	152,827	1.81%

Per Capita Wastewater Flow

The 2011 service population and flow metering information at the WWTP were used to determine the average per capita loading rate. Based on City records there are 13,328 sewer accounts. Of these accounts, 11,010 are single family residential connections, 501 multi-family and 1,817 are commercial/light industrial. Based on the City's Water Facility

Inventory Sheet, the multi-family accounts represent 3,812 equivalent residential units (ERU). The resulting total number of ERUs is 14,822.

The 2010 Census estimated 3.43 individuals per household. With 14,822 ERUs, this equals a sewer service population of 50,839. Based on an average dry weather flow at the WWTP for 2011 of 3.98 million gallons per day (mgd), the resulting flow per capita is 78 gallons per capital per day (gpcd).

This average per capita wastewater flow was compared to other northwest municipal entities of similar size and climate conditions. As indicated by Table 2-3, the City's per capita flow is similar to other municipal entities in the Northwest. Note that the Spokane County value includes the City of Spokane.

Table 2-3
Northwest Per Capita Wastewater Flow Comparison

City	Per Capita Demand, gpcd
Kennewick, WA	75
Nampa, ID	60
Spokane County, WA	100
Bend, OR	80
Pocatello, ID	95

For planning purposes a per capita flow of 80 gpcd will be used with the associated projected population served by area within the City to determine future flows.

Wastewater Flow Projection by Basin

As discussed in Section 1, the City's current UGA is divided into 20 drainage basins for the collection of wastewater. Two (2) basin areas have been added outside of the UGA. These areas, the Northwest Service Area and the East Service Area, were added at the request of the City based on current and projected growth trends and interest by developers. Figure 2-1 defines the boundaries of these sewer basins in relation to the City limits and UGA.

The service population served represents 83 percent of the 61,465 people in the City in 2011. To accurately assign current wastewater flows the sewer connections were spatially located in the system to determine sewer flow distribution. For further wastewater flow determination by basin, two (2) methods were used based on whether the area served was residential/commercial or industrial. For the residential/commercial areas, a population based method was used, which incorporated the Transportation Analysis Zone data from the Draft 2011 - 2030 Regional Transportation Plan. For the industrial areas a value of 1,500 gpd per acre (not including the undevelopable areas, assumed at 10 percent of the total area) was used. This aligns with the City's current planning criteria and recently used for the Commercial Kahlotus Lift Station Project which serves the industrial East Service Area basin on the eastern edge of the City. Figure 2-1 also shows the industrial areas by basin that use a land based method to develop future flow projection.

Using the projected population and 80 gpcd the average wastewater flows for each basin were determined. Table 2-4 presents the population and flow by basin for current and future conditions. This includes the assumption that by 2031 the City will serve 100 percent of the population within the service area, thereby eliminating all individual on-site septic systems. Therefore, wastewater flows will increase faster than the population growth rates as a result of converting existing on-site systems to the City's collection system. Based on the difference between the 2011 population served and total population within the City of Pasco, an estimate of 2,700 septic tanks will be eliminated by 2031.

Table 2-4
City of Pasco Population Based Wastewater Flow Projections by Basin

Basin	Number of Connections	Population Served	2011* Population	2031* Population	2011 Flow, gpd	2031 Flow, gpd
Broadmoor Blvd Interceptor	1793	6,839	7,032	7,737	535,425	618,960
East Service Area	0	-	18	18	-	-
Hillsboro Interceptor	27	103	160	205	8,063	16,400
NE Commercial Ave Area	0	-	8	8	-	-
North Court St Area	0	-	184	2,441	-	195,280
Northwest Service Area	0	-	479	1,805	-	144,400
PRL	825	3,147	4,008	4,252	246,361	340,160
PSC1	1703	6,496	4,745	7,183	508,549	574,640
PSC2	642	2,449	4,671	4,967	191,714	397,360
PSC3	914	3,486	3,694	4,011	272,938	320,880
PSC4	1930	7,362	7,898	8,719	576,336	697,520
PSC5	146	557	983	1,027	43,598	82,160
PSC6	1325	5,054	4,303	4,958	395,671	396,640
Road 40 East Interceptor	1	4	559	652	299	52,160
Road 44 Interceptor+	1102	4,204	4,991	10,158	329,079	812,640
Road 68 Interceptor+	2007	7,656	7,781	16,384	599,329	1,310,720
Road 84 Interceptor+	155	591	2,465	3,699	46,286	295,920
Sacajawea Park Road Interceptor	0	-	307	348	-	27,840
Southeast Pasco Trunk	17	65	252	411	5,077	32,880
West Pasco Trunk+	741	2,827	6,927	10,354	221,277	828,320
Total	**13,328**	**50,839**	**61,465**	**89,337**	**3,980,000**	**7,144,880**

*Based on OFM Population Numbers and 2011-2030 Regional Transportation Plan
+ Basin will experience increase in flow related to the elimination of septic tanks over the planning period.

To determine future industrial wastewater flow projections a second methodology was used due to limited information on existing industrial wastewater flows. This is attributed to the City's current industrial wastewater practice of treating large industrial food processor wastewater flows through a separate Reuse Wastewater Treatment Plant that the City maintains. This facility, located in the northeast part of the City, collects and provides treatment of food processor flows prior to land application. The facility treats up to a maximum flow of 10.3 mgd. No residential sewage is conveyed in this system. The Reuse Wastewater Treatment Plant is currently close to capacity and would require expansion for new food processors. Additionally if a large industrial food processor located in the Road 40 East Interceptor or East Service Area, major improvements would be required to construct a separate conveyance system to the Reuse Wastewater Treatment Plant. Therefore, an industrial food processor could discharge to the City's collection system with the appropriate pretreatment.

Light industrial development is limited within the City's service area and historic or land based flow data associated with this type of development is not available. Due to the lack of existing representative flow rates, an acreage based build out flow projection of 1,500 gpd per acre was used to develop future industrial wastewater flows.

The 1,500 gpd per acre represents the estimated build out wastewater flows that will be expected. In reviewing the City Comprehensive Plan growth projections, it was estimated that it would take more than 70 years to achieve total build out in the available industrial area. To determine the 20-year wastewater flow projection, an estimate of 25 percent of the projected build out wastewater flow would be developed in that timeframe.

Table 2-5 defines the industrial areas and flows by basin that will contribute flow to the City's collection system and wastewater treatment plant. In basins that included both residential and industrial areas, the industrial area was identified and calculated separately to eliminate any duplication of wastewater flows. It is assumed that 10 percent of the industrial area will be undevelopable and required for right-of-way, and will not contribute to wastewater generation. Additionally, based on discussions with City staff, the East Service Area is assumed to have 40 percent of the industrial area dedicated for large food processors that will discharge industrial flows to the City's Industrial Wastewater Treatment system. The current land use planning has identified significant near-term industrial development opportunities in the Road 40 East Interceptor and East Service Area. To address the potential for the near-term industrial growth in this area, the City has identified an initial industrial flow allocation of one (1) mgd to be included in the current system evaluation.

Additionally, the City has an agreement with the Port of Walla Walla to accept 360,000 gpd of industrial wastewater. This flow will contribute to the Sacajawea Park Road interceptor, as shown in the following table.

Table 2-5
City of Pasco Industrial Wastewater Flow Projections by Basin

Basin	Industrial Area, acres	Near-Term Industrial Allocation Flow, gpd	2031 Industrial Flow, gpd	Buildout Industrial Flow, gpd
East Service Area	1,650	-	309,381	1,237,523
Hillsboro Interceptor	2,755	-	929,830	3,719,320
NE Commercial Ave Area	1,322	-	247,868	991,470
PSC4	327	-	110,464	441,855
PSC5	86	-	29,141	116,563
PSC6	91	-	30,737	122,948
Road 40 East Interceptor	1,580	1,000,000	1,533,226	2,132,906
Sacajawea Park Road Interceptor	736	360,000*	608,335	993,339
Southeast Pasco Trunk	771	-	260,279	1,041,116
Total	**9,319**	**1,360,000**	**4,059,260**	**10,797,040**

*Flow from the Port of Walla Walla, which is set by agreement at 360,000 gpd. Future increase in flows is attributed to development within the City.

Table 2-6 presents the current and future total wastewater flows by basin combining Tables 2-4 and 2-5. These projected flows will be utilized in the evaluation to accurately load wastewater flows by area to identify the collection and treatment system requirements.

Table 2-6
City of Pasco Wastewater Flow Projections by Basin

Basin	2011 Flow, gpd	2031 Flow, gpd
Broadmoor Blvd Interceptor	562,560	618,960
East Service Area*	-	309,381
Hillsboro Interceptor*	8,063	946,230
NE Commercial Ave Area	-	247,868
North Court St.	-	195,280
Northwest Service Area	-	144,400
PRL	246,361	340,160
PSC1	508,549	574,640
PSC2	191,714	397,360
PSC3	272,938	320,880
PSC4*	576,336	807,984
PSC5*	43,598	111,301
PSC6*	395,671	427,377
Road 40 East Interceptor*	299+	1,585,386
Road 44 Interceptor	329,079	812,640
Road 68 Interceptor	599,329	1,310,720
Road 84 Interceptor	46,286	295,920
Sacajawea Park Road Interceptor*	-+	636,175
Southeast Pasco Trunk*	5,077	293,159
West Pasco Trunk	221,277	828,320
Total	**4,007,135**	**11,204,140**

* Includes industrial flow components calculated based on per acre loadings

\+ Does not include the near-term flow allocations identified in Table 2.5

Future Residential Development Wastewater Flow Projections

When planning sewer facilities for new growth areas build out flows are required to ensure that the proposed capital improvements have a 75 plus year life based on capacity. To estimate the potential residential build out wastewater flows for future growth, the following assumptions have been developed in Table 2-7. These assumptions were used when planning for future collection system facilities outside of the currently sewered areas along with hydraulic modeling, geographic information, parcel/right-of-way locations and the configuration of the existing system to generate potential alignments.

Table 2-7
Future Residential Development Wastewater Flow Projection Assumptions

Component	Criteria
Per Capita Demand	80 gpcd
Individuals per Residence	3.43
Residential Parcel Size*	10,000 sqft
ROW Allocation+	25%
Peaking Factor^	2.5

* Assumption based on Pasco Planning Division indication of typical zoning for growth areas outside of the City's service area
\+ Assumption based on Pasco Planning Division, if parks and other public land uses are planned they need to be included in addition to this percentage
^ Based on Ecology Orange Book

Future Wastewater Loadings

Table 2-8 summarizes the projected flows and loads to the WWTP in year 2031. They are based on the projected collection system flows and the assumption that future wastewater will be similar in constituent strength and characteristics as existing flows (Table 1-6), including peaking factors and concentrations. This assumption also implies that wastewater characteristics for future industrial flows are similar to existing flow characteristics and the City's pretreatment program will enforce this condition. In order to keep the WWTP operating smoothly and meet NPDES permit limits at these flows and loads, a number of improvements at the WWTP will be required. These improvements are discussed in later sections of this Comprehensive Sewer Plan.

Table 2-8
Projected Year 2031 Wastewater Characteristics

Load	Units	Annual Average	Maximum Month	Peak Day	Peak Hour	Peak Instantaneous
Flow	mgd	11.2	12.2	14.4	19.7	23.2
Flow Peaking Factor	--	1	1.09	1.29	1.76	2.07
BOD	lb/day	25,780	29,000	26,661	--	--
	mg/L	276	285	222		
TSS	lb/day	27,180	33,475	55,124	--	--
	mg/L	291	329	459		
Ammonia	lb/day	4,480	5,495	5,164	--	--
	mg/L	48	54	43		
Total Phosphorus	lb/day	778	875	648	--	--
	mg/L	8.3	8.6	5.4		
Temperature - High	°C	19.8	25.0	26.1	--	--
Temperature – Low	°C	19.8	14.9	12.7	--	--

Future Regulatory Conditions

The basis for planning, analysis and design of wastewater facilities must include anticipated future regulatory requirements and trends facing the City for operating a wastewater collection and treatment system. This includes potential regulations with respect to collection, treatment and discharge requirements, the status of water quality in the Columbia River, regulatory trends and discussions with the Washington State Department of Ecology (Ecology).

NPDES Permit Requirements

The Clean Water Act (CWA) of 1972, and later amendments, provides the basis for the National Pollutant Discharge Elimination System (NPDES) permit program and the structure for regulating discharge pollutants from point sources to waters of the United States. The CWA can regulate pollutants through technology and water quality based effluent limits. Additionally, the CWA defines the establishment of pretreatment programs. Other regulations that can also apply to the NPDES program include Endangered Species Act, National Environmental Policy Act, National Historic Preservation Act, Coastal Zone Management Act, Wild and Scenic Rivers Act, Fish and Wildlife Coordination Act and Essential Fish Habitat Provisions.

The City operates its wastewater collection and treatment system under Ecology NPDES Waste Discharge Permit No. WA-004496-2 issued on June 29, 2010. The permit is effective July 1, 2010 and expires June 30, 2015. The permit includes wastewater discharge limits, monitoring requirements, reporting and record keeping requirements and other conditions to maintain in-stream water quality. A copy of the permit is included in Appendix A. A fact sheet, explaining and documenting the decisions Ecology made in drafting the current permit, is also included in Appendix A.

Receiving Water Conditions

The City's WWTP discharges to the Columbia River at river mile 327.6 of the McNary Pool reach of the river, typically referred to as Lake Wallula. Per the CWA all states, every two (2) years, are to perform a water quality assessment and develop lists of impaired waters that do not meet water quality standards. Section 303(d) of the CWA establishes a process to identify and clean up polluted waters. For their water quality assessments, Ecology groups the assessed waters into categories as follows:

- ***Category 1* - Meets tested standards for clean waters**: placement in this category does not necessarily mean that a water body is free of all pollutants. Most water quality monitoring is designed to detect a specific array of pollutants, so placement in this category means that the water body met standards for all the pollutants for which it was tested. Specific information about the monitoring results may be found in the individual listings.
- ***Category 2* - Waters of concern**: waters where there is some evidence of a water quality problem, but not enough to require production of a water quality improvement project (also known as a Total Maximum Daily Load) at this time. There are several reasons why a water body would be placed in this category. A water body might have pollution levels that are not quite high enough to violate the water quality standards, or there may not have been enough violations to categorize it as impaired according to Ecology's listing policy. There might be data showing water quality violations, but the data were not collected using proper scientific methods. In all of these situations, these are waters that Ecology will want to continue to test.
- ***Category 3* - Insufficient data:** water where there is insufficient data to meet minimum requirements per Ecology Policy 1-11.
- ***Category 4* - Polluted waters that do not require a Total Maximum Daily Load (TMDL)**: waters that have pollution problems that are being solved in one of three ways:
  - ***Category 4*a -** has a TMDL: water bodies that have an approved TMDL in place and are actively being implemented
  - ***Category 4*b -** has a pollution control program: water bodies that have a program in place that is expected to solve the pollution problems. While pollution control programs are not TMDLs, they must have many of the same features and there must be some legal or financial guarantee that they will be implemented.
  - ***Category 4*c -** is impaired by a non-pollutant: water bodies impaired by causes that cannot be addressed through a TMDL. These impairments include low water flow, stream channelization, and dams. These problems require complex solutions to help restore streams to more natural conditions.

- ***Category 5* - Polluted waters that require a TMDL**: the traditional list of impaired water bodies traditionally known as the **303(d) list**. Placement in this category means that Ecology has data showing that the water quality standards have been violated for one or more pollutants, and there is no TMDL or pollution control plan. TMDLs are required for the water bodies in this category.

After Ecology's 2008 Water Quality Assessment, and with Environmental Protection Agency (EPA) approval, the state went to a rotating system for completing the assessments. Due to the volume of new data and the time required to organize, assess and review the listings; Ecology has gone to an alternating marine and freshwater cycle. The current EPA approved Water Quality Assessment focuses on new marine waters and includes the previously listed freshwaters. The next assessment list for freshwater will be covered by the 2012 Water Quality Assessment which is presently in progress and is scheduled for submittal to EPA in the summer of 2014.

A review of the current Water Quality Assessment identified 17 sections of the Columbia River from northwest of the City to just below the McNary Dam. Due to their proximity to the City's current and potential future treated wastewater outfalls, these areas of impaired water have the potential to impact the discharge limits in the City's NPDES permit. Figure 2-2 and Table 2-9 show the location, type and category of impairment type for each of these 17 sections. Parameter listings with a category 3 assessment (insufficient data) are not included and those with a category 1 assessment (meets standards) are shown in italics.

Figure 2-2
Relevant Water Quality Assessment Listings

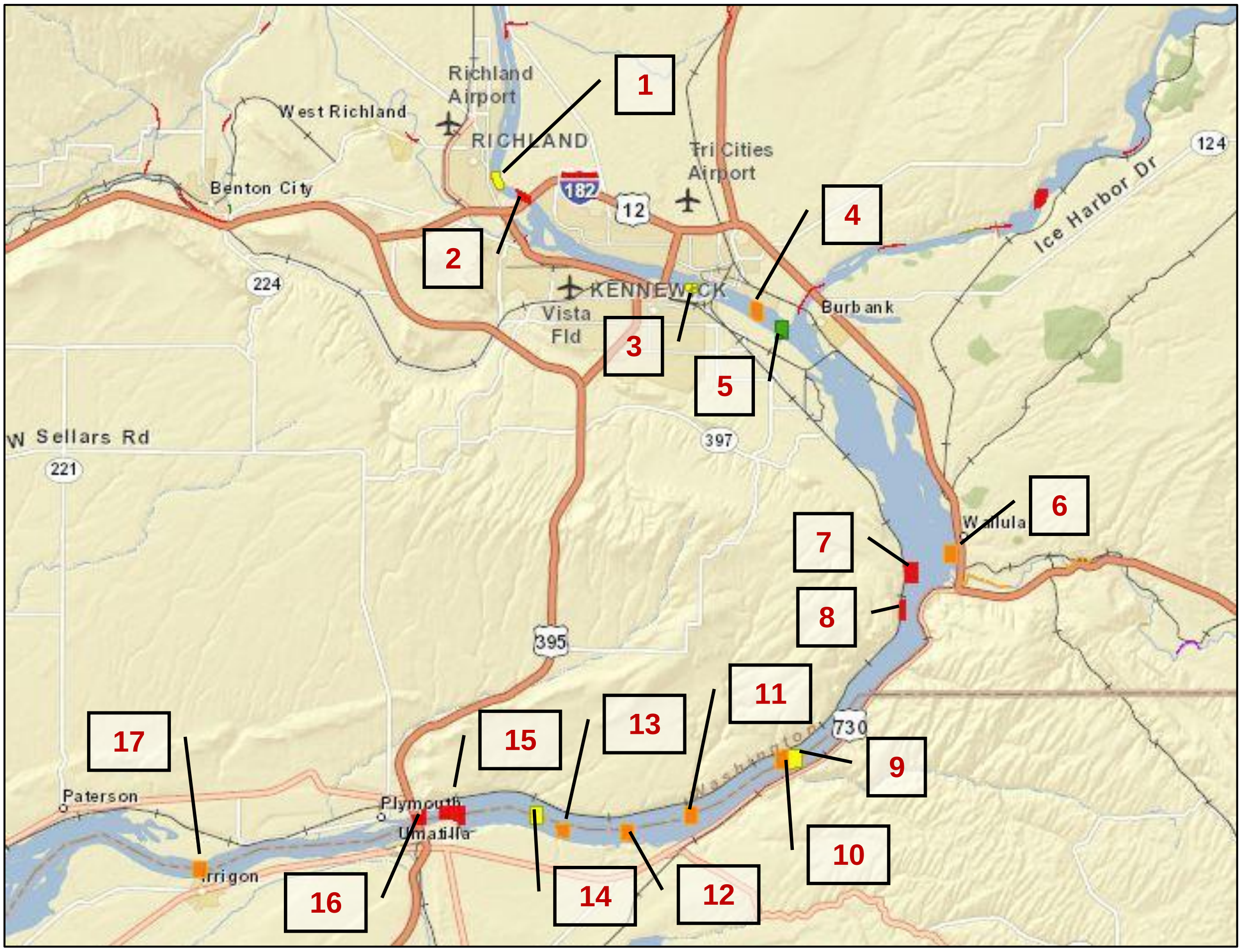


Table 2-9
Relevant Water Quality Assessment Listings

Area No.	Listing ID	Medium	Parameter	Category
1	8288	Water	pH	2
2	6309	Water	Temperature	5
2	8289	Water	Total Dissolved Gas	4A
3	16060	Water	pH	2
4	8800	Tissue	Dioxin	4A
5	*16883*	*Water*	*pH*	*1*
6	8803	Water	Dioxin	4A
7	21541	Water	Temperature	5
8	21542	Water	Temperature	5
9	*16880*	*Water*	*pH*	*1*
10	16881	Water	Temperature	2
11	18520	Tissue	4,4'-DDE	2
11	18553	Tissue	Aldrin	2
11	18628	Tissue	Chlordane	2
11	18740	Tissue	Hexachlorobenzene	2
11	18819	Tissue	PCB	2
11	34874	Tissue	Dioxin	4A
12	8799	Tissue	Dioxin	4A
13	18518	Tissue	4,4'-DDE	2
13	18551	Tissue	Aldrin	2
13	18626	Tissue	Chlordane	2
13	18738	Tissue	Hexachlorobenzene	2
13	18817	Tissue	PCB	2
13	34868	Tissue	Dioxin	4A
14	18517	Tissue	4,4'-DDE	2
14	18550	Tissue	Aldrin	2
14	18625	Tissue	Chlordane	2
14	18737	Tissue	Hexachlorobenzene	2
14	18816	Tissue	PCB	2
14	34867	Tissue	Dioxin	4A

15	*16877*	*Water*	*pH*	*1*
15	16878	Water	Temperature	2
16	6299	Water	Temperature	5
16	7963	Water	Total Dissolved Gas	4A
16	6300	Water	Temperature	5
16	7965	Water	Total Dissolved Gas	4A
16	*11086*	*Water*	*Ammonia-N*	*1*
16	*11092*	*Water*	*Arsenic*	*1*
16	11093	Water	Mercury	2
16	11094	Water	Temperature	5
16	11095	Water	pH	2
16	*16782*	*Water*	*Bacteria*	*1*
17	8798	Tissue	Dioxin	4A

General Wastewater Trends

Increase Efficiency and Sustainability

The costs of operating a sewage collection system and WWTP are increasing rapidly as electrical, chemical and staffing costs increase. This leads to the need for increasing efficiency and sustainability of operations. A few key areas frequently upgraded are high efficiency motors on pumps, variable frequency drives, more efficient process systems, energy recovery, lighting and HVAC systems. The City recently replaced two of the centrifugal blowers with high efficiency turbo blowers and will be receiving an energy credit from BPA to help offset the cost of the equipment.

The increase in the level of controls and instrumentation within the collection and treatment systems is another trend to increase efficiencies. Broadly, this includes collection, storage and use of data. The number and type of sensors is increasing. Operations are using multiple sensors in real time to operate collections systems and treatment plants more effectively and are fixing issues before they become expensive problems. The use of supervisory control and data acquisition has made the transfer and storage of information easier. This has allowed historical data trending for improved operation and maintenance.

Asset Management

Asset management systems are becoming more detailed and effective. Asset management generally is the systematic process of operating, maintaining, and upgrading assets cost-effectively. Effective asset management leads to better operational decisions, efficient allocation of resources, greater ability to plan and implement future repairs and replacement, and improved emergency response. Combined with a geographic information system, asset management becomes a power tool for the day to day operation of the system that can be used by all system operators and managers.

Water Reclamation

The recognition that water is a vital resource in the region and that wastewater effluent has potential value requires consideration of water reclamation and reuse opportunities for the City. The need to identify and pursue opportunities for water reclamation and reuse as a part of system planning and development will be economically, socially and environmentally driven in order to maintain a sustainable resource.

Discharge Limitations

In a memo from EPA titled *Working in Partnership with States to Address Phosphorus and Nitrogen Pollution through Use of a Framework for State Nutrient Reductions,* Acting Assistant Administrator Nancy Stoner dated March 16, 2011, EPA outlines the EPA's commitment in accelerating the reduction of nitrogen and phosphorus loadings. The memo goes on to recommend "…effectiveness of point source permits in target/priority sub-watersheds for Municipal and Industrial Wastewater Treatment Facilities that contribute to significant measureable nitrogen and phosphorus loading". In the report *An Urgent Call to Action – Report of the State-EPA Nutrient Innovations Task Group* EPA lists Publicly Owned Treatment Works (POTW) as a major source of nitrogen and phosphorus to the Nation's wasterways. The report states, "There is a potential for more widespread use of nutrient limits in NPDES POTW permits where impaired or vulnerable waters are present". The report ends with a call to action and that "all major sources of nutrient must be held accountable for their contributions to the problem".

Potential Future Regulations

The potential regulations are separated into the wastewater collection system and wastewater treatment requirements.

Collection System

The Sanitary Sewer Overflow (SSO) Rule, if passed, will reduce discharges of raw sewer from sanitary sewer collection systems. The rule was originally developed in 2001 and would:

- Require capacity, management and O&M (CMOM) programs for sanitary sewers
- Clarify reporting and record keeping requirements
- Require public notification
- Clarify SSO permit requirements to municipal satellite collections systems
- Allow a permittee to establish defenses under limited conditions

The rule was signed by EPA administration but withdrawn prior to publication.

Wastewater Treatment

On March 26, 2012 a meeting was held with representatives of Washington DOE (Richard Koch and Diane Washington), Murray, Smith & Associates, Inc. and the City. While a number of topics were discussed at this meeting, the anticipated regulatory requirements for the WWTP over the next 20 years was a specific area of focus. After discussing Ecology's Water Quality Assessment on the Columbia River, EPA's focus on nutrient pollution and general regulatory trends; it was agreed that the following regulatory assumptions were reasonable to use in the comprehensive sewer planning effort.

- Thru Year 2019 - effluent limits unchanged
- Year 2020 to 2030 - nitrification required (effluent ammonia < 1 mg/l)
- Year 2031 - phosphorus removal required (TP < 1 mg/l)

In addition, it is advised that the City actively monitor updates to Ecology's Water Quality Assessment listings and the subsequent development of pollution control plans and TMDLs for identified pollutants. There are a number of identified pollutants of concern (category 2) identified on the Ecology's current Water Quality Assessment that could potentially impact the operation of the City's sewer collection and treatment system.

For example, future downstream temperature mitigation plans could result in discharge temperature limits for the treatment plant. Future mitigation plans for mercury, PCBs and pesticides could require the City to monitor and control discharges into the sewer system.

Pretreatment Regulations

Future regulatory requirements facing the City include meeting the General Pretreatment Regulations of the EPA National Pretreatment Program. On February 1, 2013 the City received an Administrator Order from Ecology requiring that the City develop and maintain a formal pretreatment permitting and engineering review program. A copy of this letter is in Appendix B.

The National Pretreatment Program requires all large POTW, which have a designed treatment capacity of more than five (5) mgd to establish local pretreatment programs. These local programs must enforce all national pretreatment standards and requirements in addition to any more stringent local requirements necessary to protect site-specific conditions at the POTW. Since POTWs are not designed to treat most toxic or non-conventional pollutants that are present in industrial waste, the purpose of the National Pretreatment Program is to protect POTWs and the environment from the adverse impacts that may occur when hazardous or toxic wastes are discharged into a sanitary sewer system.

The National Pretreatment Program is charged with controlling toxic, conventional, and non-conventional pollutants from nondomestic sources that discharge into sewer systems, as described in CWA Section 307(a). This is achieved mainly by regulating nondomestic (industrial) users of POTWs that discharge toxic wastes or unusually strong conventional wastes. In Washington State, Ecology implements this program for the EPA.

Currently Ecology administers the pretreatment program for the City. Currently there are two (2) industrial users (IU) that have pretreatment permits to discharge to the City's wastewater collection system. These are:

- A1 Quality Services
- Easterday Farms Produce Company

Ecology also maintains the discharge permits for the City's Reuse Facility that receives food processing wastewater from four dischargers. These are:

- Bybee Foods LLC
- Pasco Processing
- Reser Fine Foods
- Twin City Foods

The City's WWTP design capacity was evaluated as part of this Comprehensive Sewer Plan update and is estimated to be greater than five (5) mgd, refer to Section 4. Thus Ecology will be requiring that the City develop a pretreatment program and become the "Delegated Authority" in administering it. That requires the City to pass local ordinances, issue their own discharge permits and run their own pretreatment program. To become the Delegated Authority the City will need to develop a pretreatment program as defined in the *Introduction to the National Pretreatment Program*. The POTW's NPDES permit is modified to require development of a local program and submission of the program elements to the Approval Authority (Ecology) for review and approval. Consistent with CWA Section 403.8(f), POTW pretreatment programs must contain six (6) minimum elements:

1. Legal Authority

   The POTW must operate pursuant to legal authority enforceable in federal, state or local courts, which authorizes or enables the POTW to apply and enforce any pretreatment requirements developed pursuant to the CWA and implementing regulations. At a minimum, the legal authority must enable the POTW to
   i. Deny or condition discharges to the POTW;
   ii. Require compliance with pretreatment standards and requirements;
   iii. Control IU discharges through permits, orders, or similar means;
   iv. Require IU compliance schedules when necessary to meet applicable pretreatment standards and/or requirements and the submission of reports to demonstrate compliance;
   v. Inspect and monitor IUs;
   vi. Obtain remedies for IU noncompliance; and
   vii. Comply with confidentiality requirements.

2. Procedures

   The POTW must develop and implement procedures to ensure compliance with pretreatment requirements, including

i. Identifying and locating all IUs subject to the pretreatment program;
ii. Identifying the character and volume of pollutants contributed by such users;
iii. Notifying users of applicable pretreatment standards and requirements;
iv. Receiving and analyzing reports from IUs;
v. Sampling and analyzing IU discharges;
vi. Evaluating the need for IU slug control plans;
vii. Investigating instances of noncompliance; and
viii. Complying with public participation requirements.

3. Funding

   The POTW must have sufficient resources and qualified personnel to carry out the authorities and procedures specified in its approved pretreatment program.

4. Local Limits

   The POTW must develop local limits in defined circumstances or demonstrate why these limits are not necessary.

5. Enforcement Response Plan (ERP)

   The POTW must develop and implement an ERP that contains detailed procedures indicating how the POTW will investigate and respond to instances of IU noncompliance.

6. List of SIUs

   The POTW must prepare, update, and submit to the Approval Authority a list of all SIUs and where applicable indicate which SIUs are NSCIUs or MTCIUs.

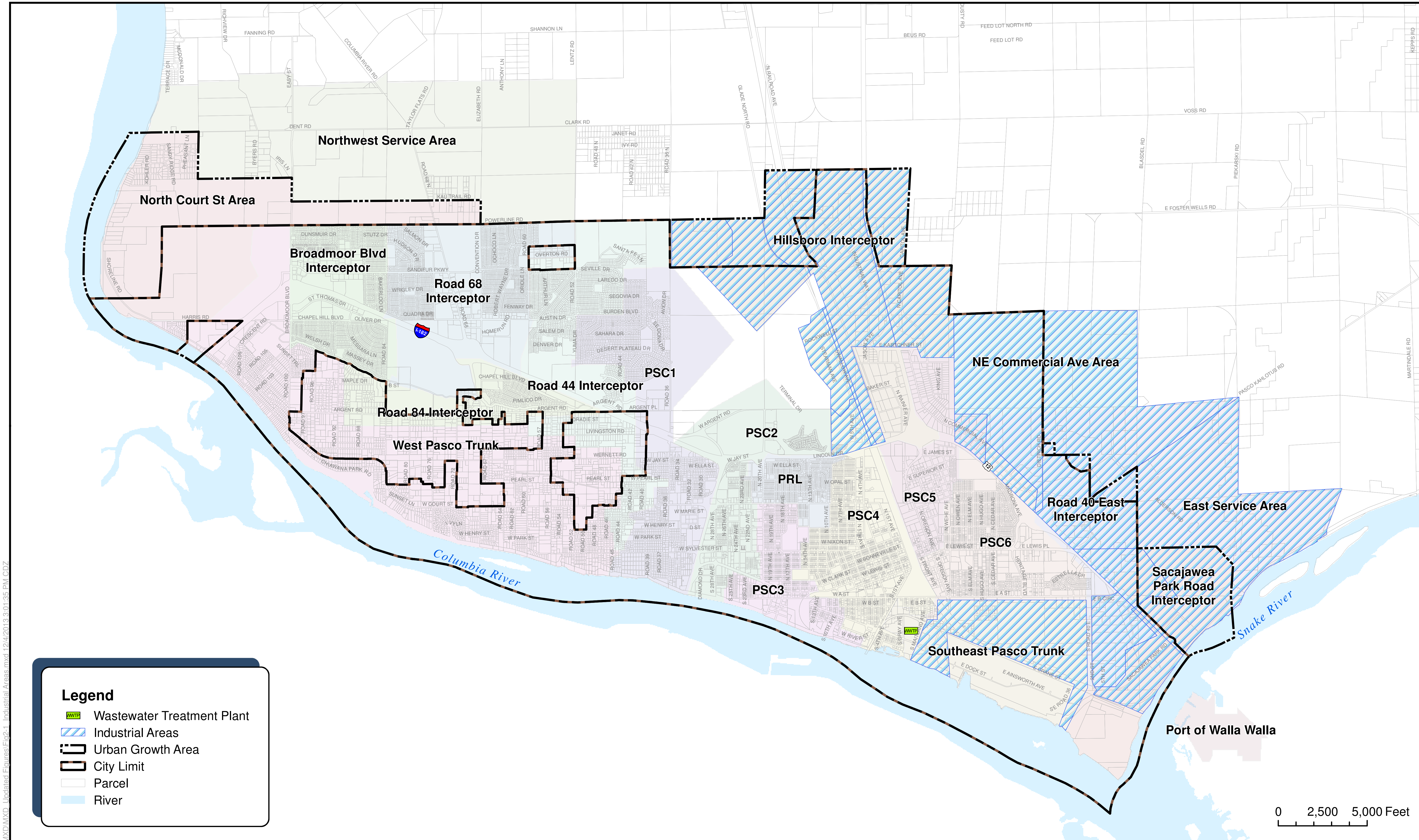
In addition to the six specific elements, pretreatment program submissions must include the following [40 CFR 403.9(b)]:

- A statement from the city solicitor (or the equivalent) declaring that the POTW has adequate authority to carry out program requirements.
- Copies of statutes, ordinances, regulations, agreements, or other authorities the POTW relies upon to administer the pretreatment program, including a statement reflecting the endorsement or approval of the bodies responsible for supervising or funding the program.
- A brief description and organizational chart of the organization administering the program.
- A description of funding levels and manpower available to implement the program.

In addition to Ecology's February 1, 2013 Administrative Order outlining the process and requirements for the City to develop an approved pretreatment program, Ecology has indicated that they plan to delegate the Reuse WWTP permitting to the City as well. Once the City meets the requirements of the pretreatment program, Ecology will give the City "Delegated Authority" to implement the pretreatment program. Implementation of this program will be coordinated with the current permit cycle that Ecology has with industrial discharges in the City to allow for renewing of the permit to coincide with being transferred to the City.

Ecology is requiring that the pretreatment program be in place by January 1, 2015. The City is currently on track to meet the January 1, 2015 deadline based on the following milestones for pretreatment delegation.

- Industrial User Survey – Completed May 31, 2013
- Sampling to determine Local Limits – Began October 2013 and ongoing
- Submit Proposed Sewer Use Ordinance – Draft submitted for review April 1, 2014
- Submit Local Limits evaluation – Due June 1, 2014
- Mercury Control Plan – Due June 1, 2014
- Draft Program Procedures Manual – Due June 1, 2014
- Final Program Procedures Manual – Due August 1, 2014
- Submit Pretreatment Program – Due November 1, 2014
- Pretreatment Delegation – January 1, 2015



Comprehensive Sewer Plan

Figure 2-1
Industrial Areas
Defined by Sewer Basins

March 2013 11-1261

SECTION 3
COLLECTION SYSTEM ANALYSIS

To analyze the existing wastewater collection system a hydraulic model was developed to simulate performance of the system with respect to flows and system capacities. This section presents the hydraulic sanitary sewer model development, the collection system design standards criteria, and the analysis results under existing and 2031 conditions.

Model Development and Calibration

Hydrologic and Hydraulic Model Software Selection

InfoSWMM (Innovyze) software was used to perform the wastewater collection system modeling and analysis. InfoSWMM is a dynamic wastewater modeling software application that runs within the ArcGIS software environment. InfoSWMM allowed for efficient network construction. The model network was constructed using GIS data available from a previous modeling effort and augmented with updated CAD based information. Facility information for each of the major lift stations was collected and input into the model. Land base information, such as tax lot, street mapping and aerial photos, was also used as reference. In addition to dynamic wave routing of the gravity and pressurized collection system, InfoSWMM's model capabilities allow for continuous rainfall-runoff simulations to simulate wet weather infiltration and inflow (I/I).

Network Construction

The City of Pasco (City) provided information, including CAD files, shapefiles based on the original HYDRA model and Franklin County GIS data that was examined and used to develop the existing model. All subsequent updates to the model were then done within the InfoSWMM program.

The network parameters used to calculate the system hydraulics include pipeline length, diameter and invert elevation, as well as manhole invert and rim elevations. Lift station characteristics include the number of pumps, wet well dimensions, pump controls and pump curves.

For many of the modeled manholes, invert elevation or ground elevation information was not available, or was inconsistent between the CAD file and the original HYDRA model. In some cases the HYDRA model noted that certain elevation values had been assumed. These notes were preserved in the "User Tag" field of the InfoSWMM model junctions. A spot check of 10 locations in the system was conducted using survey equipment. Due to the historical use of several vertical datums, differences between the surveyed locations and those identified within the CAD and GIS data were identified. The profiles of the modeled pipelines were also evaluated to identify areas with questionable grade changes. A number of these areas were then field checked by City crews where the manhole depth was measured and compared with the modeled information. It is recommended that the City collect additional “survey grade” rim and invert elevations for the areas, to continue to improve the accuracy of the model for future evaluations.

The City's major lift stations, listed in Table 3-1, were included in the model. For each lift station, the model includes the wet well, one (1) or more pumps, and a force main pipe. For normal operations, each pump has an assigned start and stop depth. The pump flow is calculated by the model using the suction and discharge heads and corresponding pump curve, with the exception of the Road 36 and Burden Lift Station, for which no curve was available. The pumps at the Road 36 and Burden Lift Station are modeled so that the suction flow entering the facility is equal to the discharge flow.

Table 3-1
Modeled Lift Stations

Lift Stations		
9th and Washington	Maitland	Road 36 and Burden
Navy Base	Pearl Street	Pennie Avenue

Flow Generation and Calibration Overview

Wastewater flows consist of domestic (residential, commercial and institutional) and large discharger (primarily industrial) sources. Dry weather flow (DWF) modeling includes the generation of average daily loadings for all sources and the generation of diurnal curves that are used to vary the average daily loadings over the course of 24 hours. DWF calibration includes refinements to the total magnitude and spatial variability of the loadings and refinements to the shape of the diurnal curve. After dry weather calibration is completed, wet weather calibration can begin.

The total wet weather loading consists of the DWFs plus the wet weather contribution referred to as I/I. An I/I response is generated by applying a selected rainfall event, or storm, which is related to I/I through the use of a synthetic unit hydrograph, and a defined sewershed area. Wet weather calibration consists of adjusting the synthetic unit hydrograph to match model results with observed flow monitoring data collected during storm events.

Flow Monitoring Overview

Flow monitoring was performed over a period of six (6) weeks starting in October of 2011 in order to provide data for the dry and wet weather model calibration. ADS Environmental (ADS) installed 10 temporary flow monitors at predefined locations throughout the collection system. The monitors were placed strategically in order to provide information for the total flows generated in large isolated areas upstream of each flow monitor. These areas upstream of each monitor were identified to correspond with the "major sewer basins" that were developed as part of the project. Figure 3-1 shows a map of the flow monitor locations, labeled by their flow monitor ID (1-10). In addition to these 10 temporary flow monitors, flow information for the 9th and Washington Lift Station, the Maitland Lift Station and the Wastewater Treatment Plant (WWTP) was also reviewed and used for the model calibration process.

The overall goal of the monitoring was to collect both DWFs and wet weather flow (WWF) events during the effort for use in the model calibration and I/I identification. Each site was monitored for approximately six (6) weeks, in the fall of 2011. During this time period no significant precipitation event occurred, and the flow data collected by the monitors did not indicate the presence of any significant variation in flow. Therefore, the flow monitoring data was used to calibrate the model to DWF, but not for the WWF calibration process.

All of the flow in the collection system passes through either the 9th and Washington or the Maitland Lift Stations. The force mains of these two (2) lift stations then convey the flow directly to the WWTP. After reviewing the 9th and Washington, Maitland and WWTP flow data, it was decided to use the total flow measured at the two (2) lift stations as an estimate of the total flow passing through the WWTP. This information was used due to concerns expressed by the City about the accuracy of the effluent flow monitor at the WWTP. It is recommended that the City further investigate the difference in flow measurements between the influent and effluent meters to analyze what is causing the difference.

DWF Generation

Model Loading

The flow rate and spatial location of the model DWF loading are based on three (3) years of winter water billing records. The average water usage for each account was calculated, and this flow value was allocated to the model as DWF. The City water customers that do not have sewer connections were removed from the analysis.

In order to determine where to load each of these calculated average flow values to the model, a process called "geo-coding" was used to convert the billing addresses to GIS-based points. These points were then allocated to the model by linking the closest manhole to the geo-coded billing record location. In most cases, the geo-coded points were assigned to the closest model manhole, but in some cases, for example when points were geo-coded as being relatively far away from the system, they were investigated further and manually assigned to a manhole. Questions that arose during this process were submitted to the City for review, and the answers that were received were used to complete this process of allocating the water billing record based flows to the model.

The question of whether it was necessary to add additional loading to the model to represent large industrial dischargers, which may not have been included in the submitted water billing records, was considered. However, the City maintains a separate reuse system that collects, stores and then land applies food processor wastewater north of the City. Constructed in 1995, the Reuse Facility was constructed to specifically serve the City's large industrial food processors and is operated seasonally. The reuse system, including its collection system, is a separate entity from the City's wastewater collection and treatment systems and therefore is not included in this analysis or considered part of this Comprehensive Sewer Plan.

Diurnal Curve Generation

The flow monitoring data collected by the 10 flow monitors in the fall of 2011 was used to construct representative daily DWF patterns (diurnal curves). This was implemented by averaging the flow values for each hour of the day across the entire flow monitoring period at each location.

The flow monitoring data was checked for the presence of wet weather effects that needed to be excluded from the averaging process when creating these dry weather diurnal curves. However, no wet weather response was evident in the monitoring data, due to the lack of significant rainfall during this time period.

Daily average flows and diurnal patterns for each flow monitor were calculated separately for weekdays (Monday through Friday) and weekend days (Saturday and Sunday). These diurnal curves were applied to the DWF loading in the model, in order to allow the magnitude of the loading to vary depending on the simulated hour of the day. The loading at each model manhole was assigned the weekday and weekend diurnal curves of the closest downstream flow monitor. For the small number of cases where there was no flow monitor located downstream of a model manhole that was assigned dry weather loading, the diurnal patterns of a nearby monitor were applied.

Dry Weather Calibration

Dry weather calibration was performed by adjusting the magnitude (average flow values) and the temporal variability (diurnal curves) of the model's dry weather loading and checking those flows at the flow monitoring stations.

All model DWFs were scaled up or down uniformly, in order to achieve an acceptable calibration to volume, to match the downstream flow monitoring location. Overall, this process resulted in an increase in the total amount of DWF applied in the model by 36 percent, from 2.93 million gallons per day (MGD) to 3.99 MGD. This discrepancy illustrates the fact that considerably more sewage is being measured at the WWTP under dry weather conditions than is being billed to City water customers. These differences may be caused by older water meters "under reporting" flow, unmetered water connections, or infiltration in the system. It is recommended that the City continue to compare flows and water billing information on a yearly basis. Based on this analysis, the City may want to consider improving water meter accuracy through calibration and replacement of existing meters.

Table 3-2 lists the original and calibrated total DWF applied as input to the model. The information is grouped by the flow monitor used for the assignment of diurnal patterns to the model loading.

Table 3-2
Original and Final (Calibrated) DWF Inflows, by Flow Monitor

Flow Monitor Site Number	Original DWF (gpm)	Calibrated DWF (gpm)	Scaling Factor
1	230	260	1.13
2	239	283	1.18
3	93	269	2.88
4	10	10	1.00
5	119	198	1.67
6	217	119	0.55
7	158	320	2.02
8	257	393	1.53
9	132	328	2.48
10	581	593	1.02
Total	2,036	2,773	1.36
Total (MGD)	2.93	3.99	1.36

Note: gpm = gallons per minute

The applied diurnal patterns were also adjusted as needed in order to achieve an acceptable calibration to the peak flow, and also to achieve good agreement to the pattern of the measured flow at each monitoring location. This process involved, in some cases, peaking the model diurnal curves up or down in order to compensate for hydraulic routing effects such as peak flow attenuation on the flow patterns as they were routed through the model.

The model was simulated over a period of two (2) days; a weekday and a weekend day. The simulation output was compared with the average measured flows for weekday and weekend days for the entire period of record at each flow monitor.

Table 3-3 shows the results of the DWF calibration by comparing the simulated peak and average flows with the measured peak and average flows at each monitoring location. Time series graphs comparing the measured and simulated flow at each location are shown in Figures 3-2 through 3-11. The graphs show the two (2) day simulated time period of a weekday and a weekend day.

It was noted by ADS during their review of the collected flow monitoring data that the peak flows recorded at site No. 9 were slightly higher than the peak flows at site No. 4. Site No. 9 is immediately upstream of No. 4, and so therefore this result indicated an inconsistency between the two (2) flow monitors. After reviewing the data, ADS recommended that site

No. 9 be considered more reliable, noting that the peak flows appeared to be understated at site No. 4. Therefore, for the model DWF calibration process, the model was calibrated to the peak flow at site No. 9.

Table 3-3
DWF Calibration Statistics

Flow Monitor Site Number	Volume Calibration			Peak Calibration		
	Measured Flow (gpm)	Modeled Flow (gpm)	Error (%)	Measured Flow (gpm)	Modeled Flow (gpm)	Error (%)
1	260	260	0.16	444	446	0.53
2	544	543	-0.2	929	932	0.33
3	271	270	-0.57	342	344	0.51
4	861	879	2.19	1399	1470	5.05
5	198	198	-0.29	334	336	0.57
6	1464	1465	0.07	2227	2231	0.18
7	1772	1785	0.77	2701	2670	-1.13
8	386	387	0.29	562	560	-0.41
9	867	871	0.43	1469	1458	-0.76
10	589	594	0.86	892	884	-0.92

Figure 3-2
DFW Calibration – Site 1
Road 100 Interceptor Basin, (MH 887)

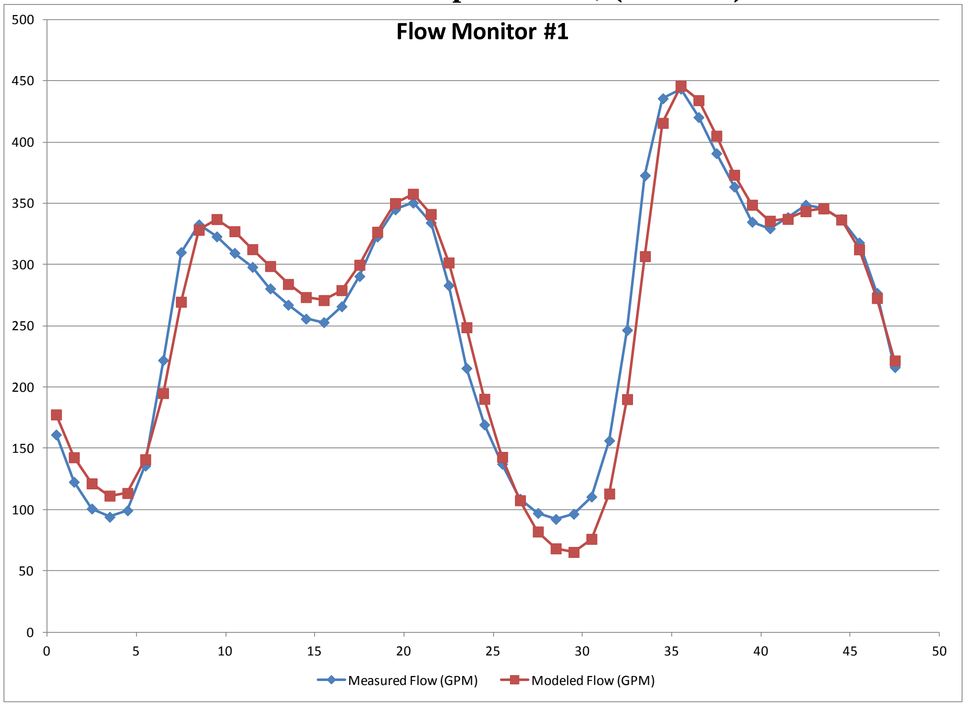


Figure 3-3
DFW Calibration – Site 2
Road 68 Interceptor Basin, (MH 946)

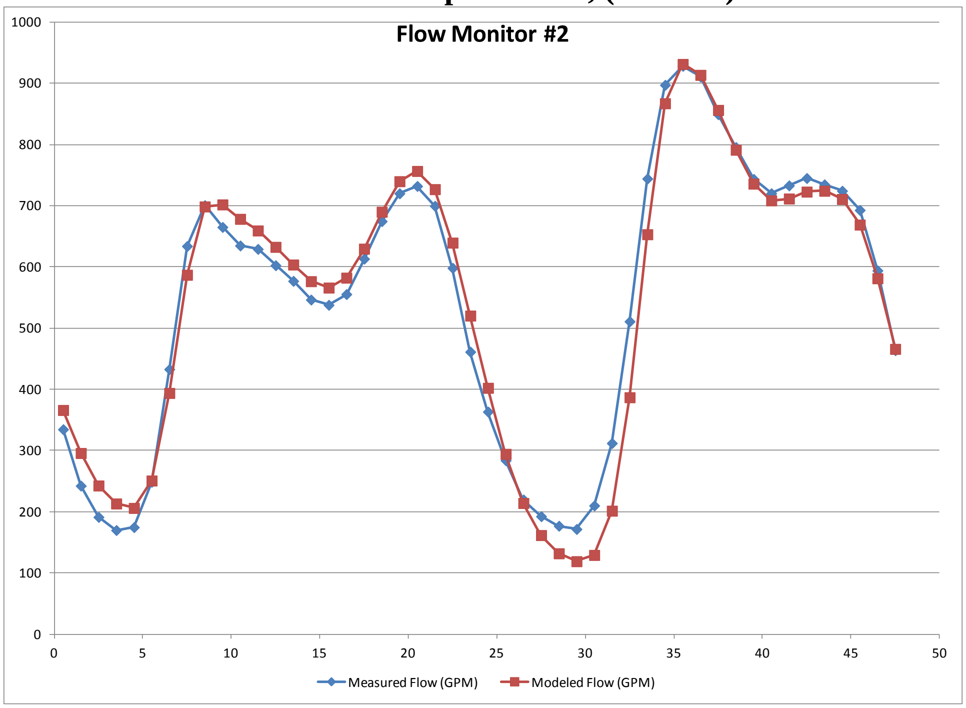


Figure 3-4
DFW Calibration – Site 3
West Pasco Trunk Basin, (MH 1318)

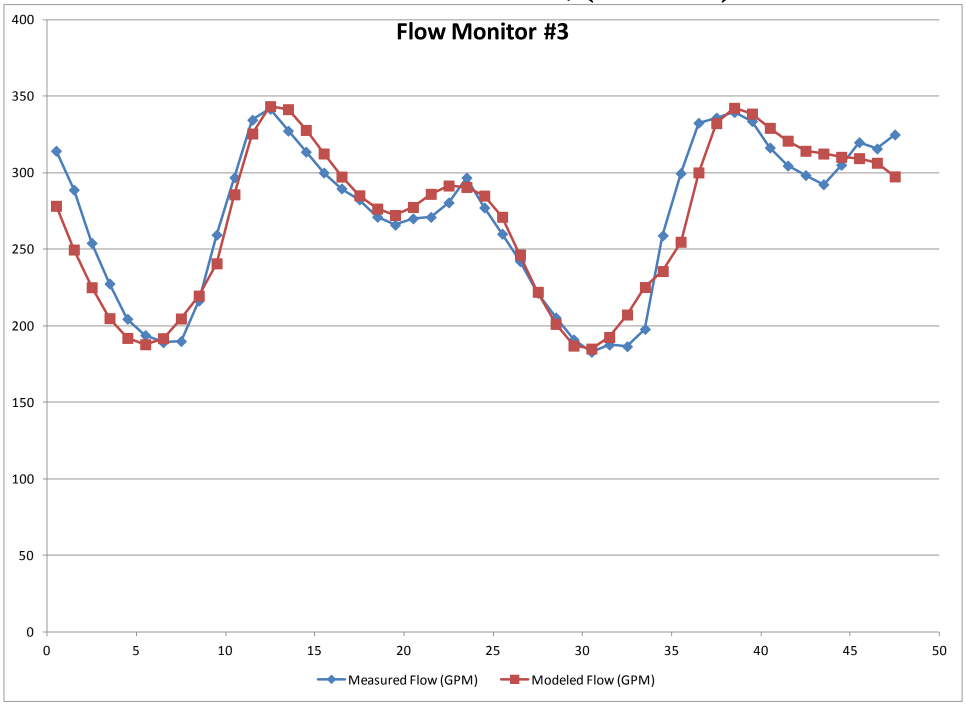


Figure 3-5
DFW Calibration – Site 4
Road 44 Interceptor Basin, (MH 1335)

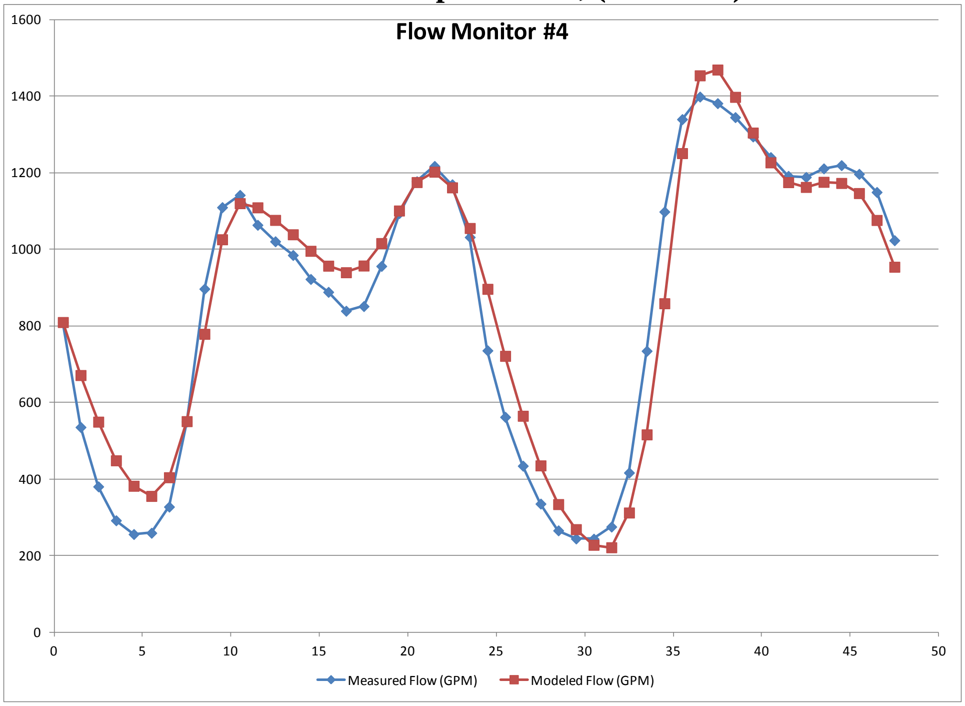


Figure 3-6
DFW Calibration – Site 5
PSC1 Basin, (MH 1535)

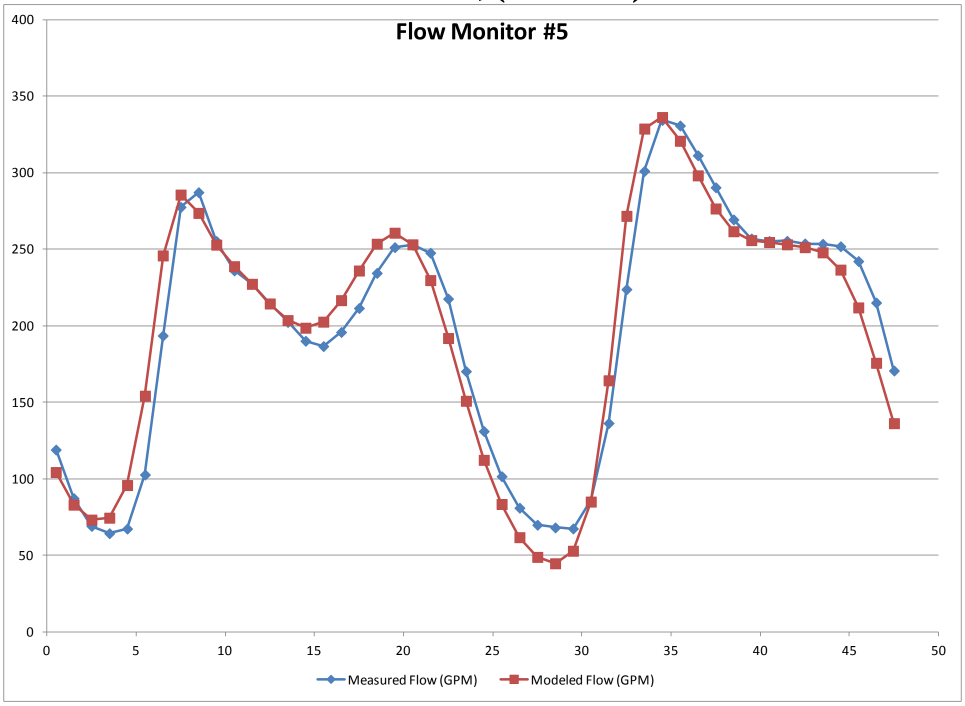


Figure 3-7
DFW Calibration – Site 6
PSC2 Basin, (MH 1694)

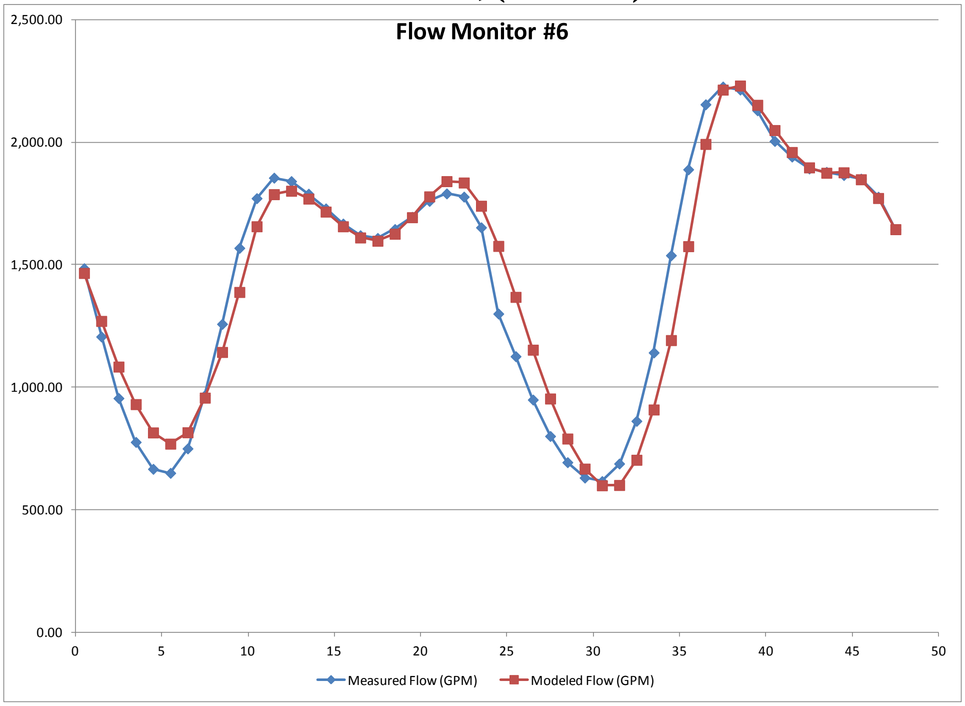


Figure 3-8
DFW Calibration – Site 7
PSC3 Basin, (MH 2198)

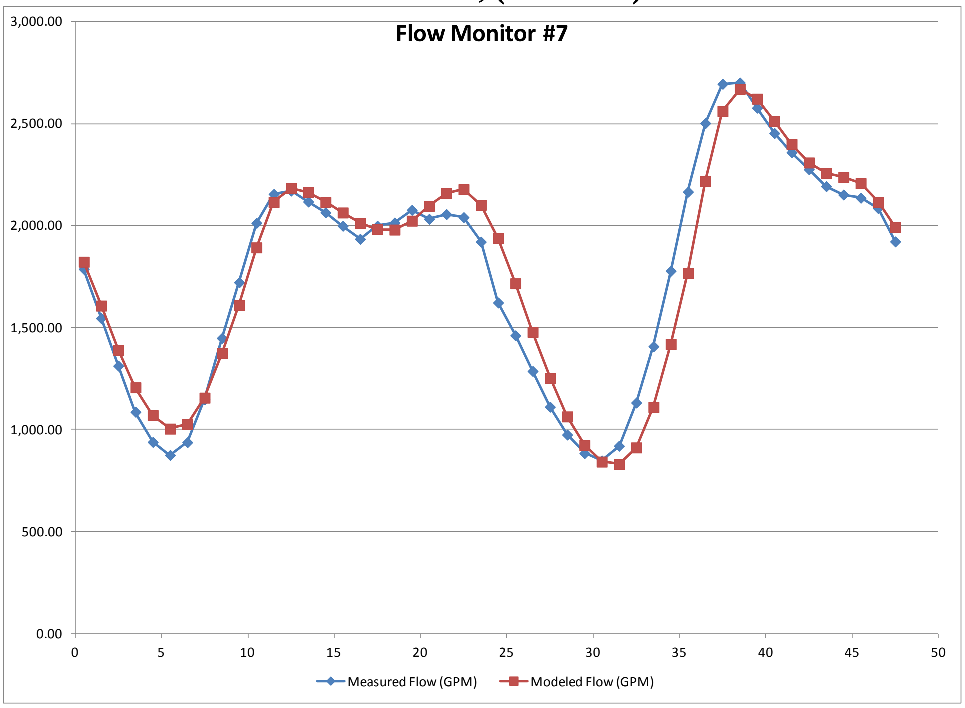


Figure 3-9
DFW Calibration – Site 8
PSC6 Basin, (MH 2569)

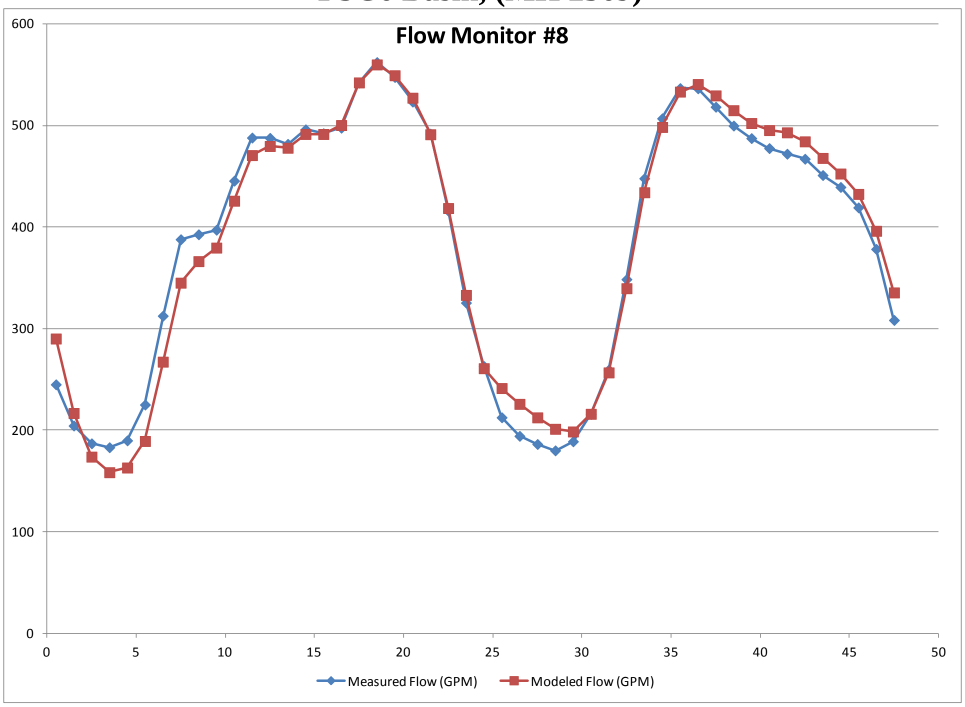


Figure 3-10
DFW Calibration – Site 9
Road 44 Interceptor Basin, (MH 1343)

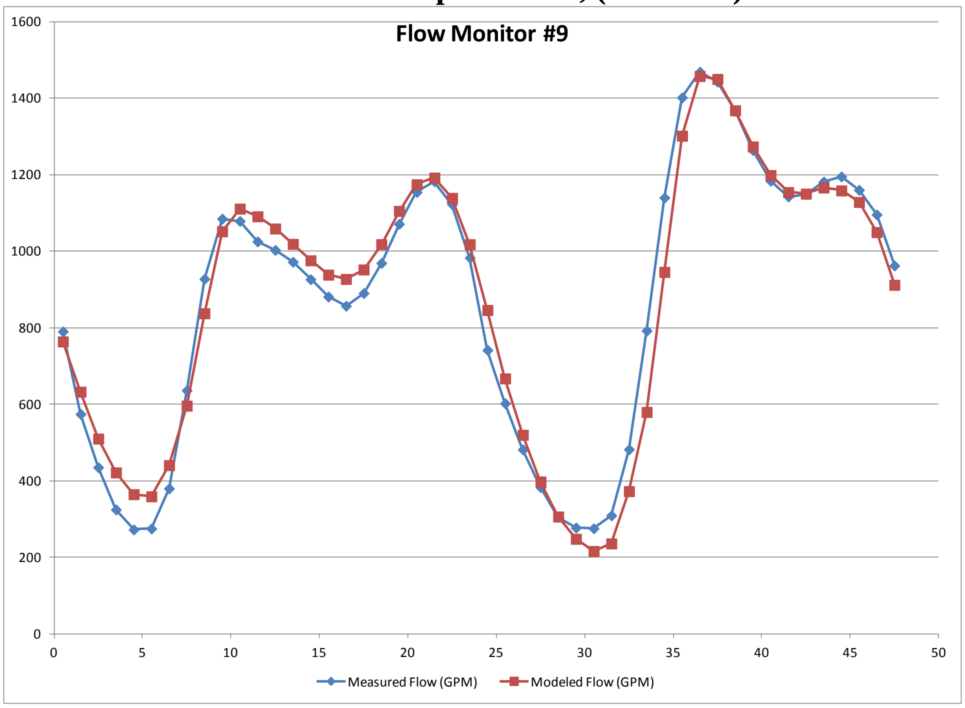
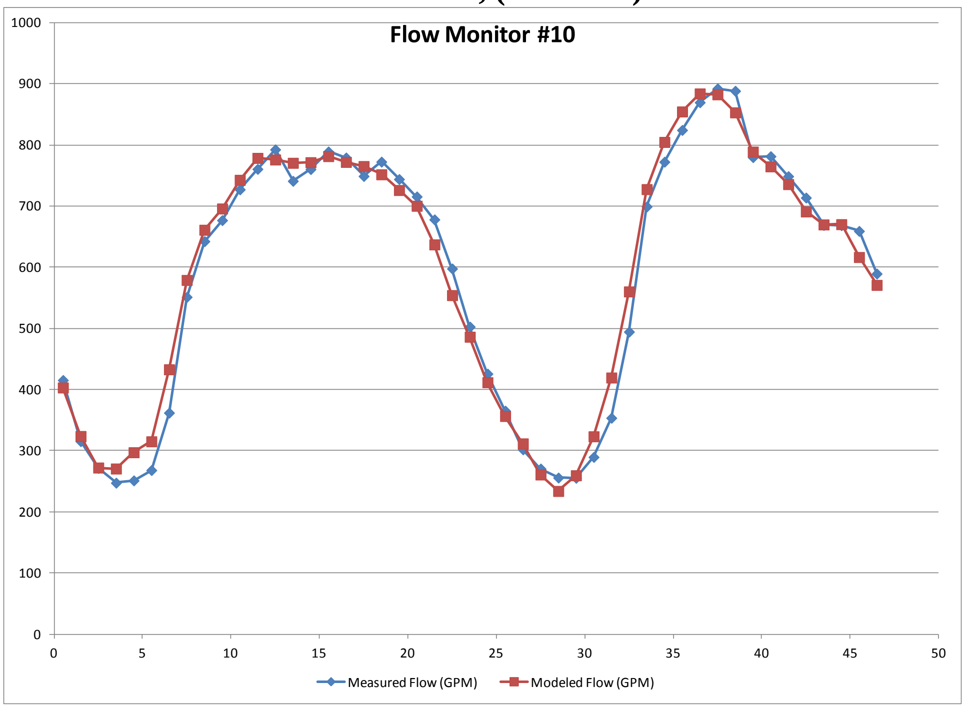


Figure 3-11
DFW Calibration – Site 10
PSC4 Basin, (MH 2322)



Wet Weather Flow Generation

Model Loading

The WWF component of the model consists of a storm event, sewershed area (wet weather area of impact), and I/I unit hydrograph. The sewershed area is that portion of the City's service area that can directly affect WWFs.

The unit hydrograph method relates a storm event to the associated I/I. The sewershed area is the portion of the basin that contributes to the wet weather I/I and is adjacent to the collection system that has the potential to contribute to inflow. A 20-foot buffer on each side of sanitary pipe was used for this study. In general, the system's sewershed area varies between 5 and 20 percent of the total area of each sewer basin. From an overall average perspective, the sewershed area represents approximately 10 percent of the sewer basin area.

In the City WWF model, I/I loading was distributed throughout the collection system by dividing the system up into areas called "sub-basins". The process used to create these sub-basins is described in detail in the "2031 Dry Weather Flow Generation" later in this section. Sewershed area flow values representing currently served sub-basin areas were defined for each of the model manholes. This allows for the conceptual representation of the WWF that enters the system from each sub-basin.
The model sewershed areas assigned to each of the manholes were calculated based on the areas of each of the sub-basins. The process determined the total area of the 20-foot pipe buffer divided by the total area of each major basin, in order to calculate a total "sewershed ratio" value. These ratios represent an estimate of the percentage of basin area contributing to I/I in the collection system. Finally, in order to calculate sewershed area values for each sub-basin, the area of each sub-basin was multiplied by the sewershed ratio of the major basin in which it was located.

In InfoSWMM, the I/I is generated from unit hydrographs which are defined by the following six (6) parameters:

R: *Fraction of rainfall that generates runoff (runoff volume parameter)*

T: *Time to the peak of the unit hydrograph (peak runoff parameter)*

K: *Ratio of the falling limb time to the rising limb time of the unit hydrograph (measure of the skewness of the hydrograph)*

Dmax: *Maximum depth of initial abstraction*

Drec: *Rate at which the initial abstraction depth is made available again*

D0: *Value of initial abstraction depth at the start of the simulation*

Wet Weather Calibration

As noted previously, no significant precipitation occurred during the fall 2011 temporary flow monitoring period. Therefore, the approach used to calibrate the model to WWF was to examine historical flow data for the WWTP (as estimated by the sum of 9th and Washington and Maitland Lift Station flows), in order to identify time periods when large flows were recorded. These time periods were then cross referenced against precipitation data in order to check for a correlation between high flows in the system and rainfall events. Precipitation data from a Weather Underground rain gauge and also a gauge located at the WWTP were examined. The rainfall and flow data examined spanned from November 2010 to December 2011.

It was found that correlations between noticeably high flows at the WWTP and significant rainfall events were present related to three rainfall events, which are summarized in Table 3-4.

Table 3-4
Precipitation Events used for Wet Weather Flow Calibration

Classification	Date and Time of Event	Total 6 Hour Rainfall Depth (Inches)
Primary Event	6/1/2011 7:00:00 PM	0.42
Secondary Event	5/15/2011 1:00:00 AM	0.37
Third Event	5/25/2011 6:30:00 PM	0.22

An analysis of the precipitation data indicated that the June 1, 2011 storm was the most severe rainfall event that occurred during the November 2010 to December 2011 time period. These three (3) events were selected for use in the WWF model calibration process. The measured flow data, against which the model simulation output was compared for the model calibration process, was a composite time series of the flows measured at the 9th and Washington and Maitland Lift Stations. The rainfall input used in the model for the WWF calibration simulations was a time series of the WWTP rain gauge precipitation data.

The model was calibrated by adjusting the InfoSWMM unit hydrograph parameters and running simulations until a suitable combination was found that generated acceptable agreement between the measured and simulated flow for each calibration event.

The distribution of the WWF model loading was adjusted during the calibration process such that more flow entered the system per linear foot of pipe in the downtown area than elsewhere in the system. The basins that were adjusted are PSC3 and PSC4. This was done in order to improve the quality of the calibration, and to be consistent with anecdotal information which indicated that the collection system in the downtown area contributes a higher amount of I/I compared with newer pipe construction. The City is planning to conduct additional flow monitoring in the downtown area in future years to validate the magnitude of the wet weather response and, if required, identify required capital projects to address it.

Table 3-5 shows the results of the WWF calibration by comparing the total simulated peak and average flows (as extracted from the full system model upstream of the 9th and Washington and Maitland Lift Stations) with the measured peak and average flows from the WWF calibration time series. Graphs comparing the measured and simulated flow are shown in Figures 3-12 through 3-14. The graphs show the two (2) day simulated time period around each calibration event.

Table 3-5
WWF Calibration Statistics

Event	Date Range	Volume Calibration			Peak Calibration		
		Measured Flow (MGD)	Modeled Flow (MGD)	Error (%)	Measured Flow (MGD)	Modeled Flow (MGD)	Error (%)
Primary	6/1 - 6/3	4.35	4.33	-0.46	8.46	8.52	0.71
Secondary	5/14 - 5/16	4.21	4.26	1.19	5.85	5.88	0.51
Third	5/25 - 5/27	4.05	4.11	1.48	6.04	6.13	1.49

Figure 3-12
Wet Weather Flow Calibration – Primary Event

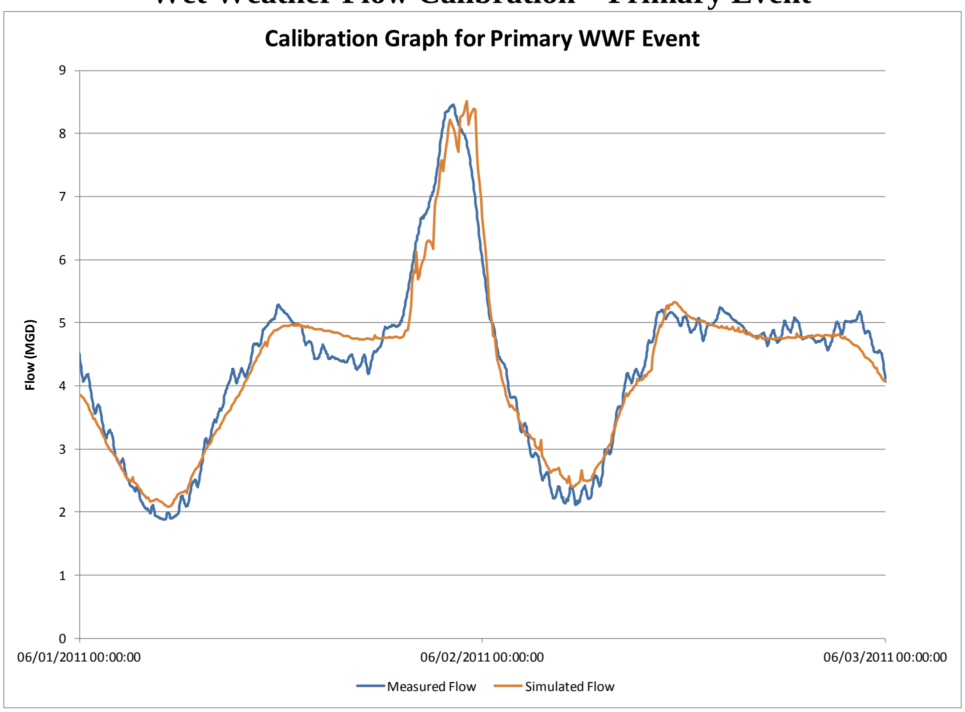


Figure 3-13
Wet Weather Flow Calibration – Secondary Event

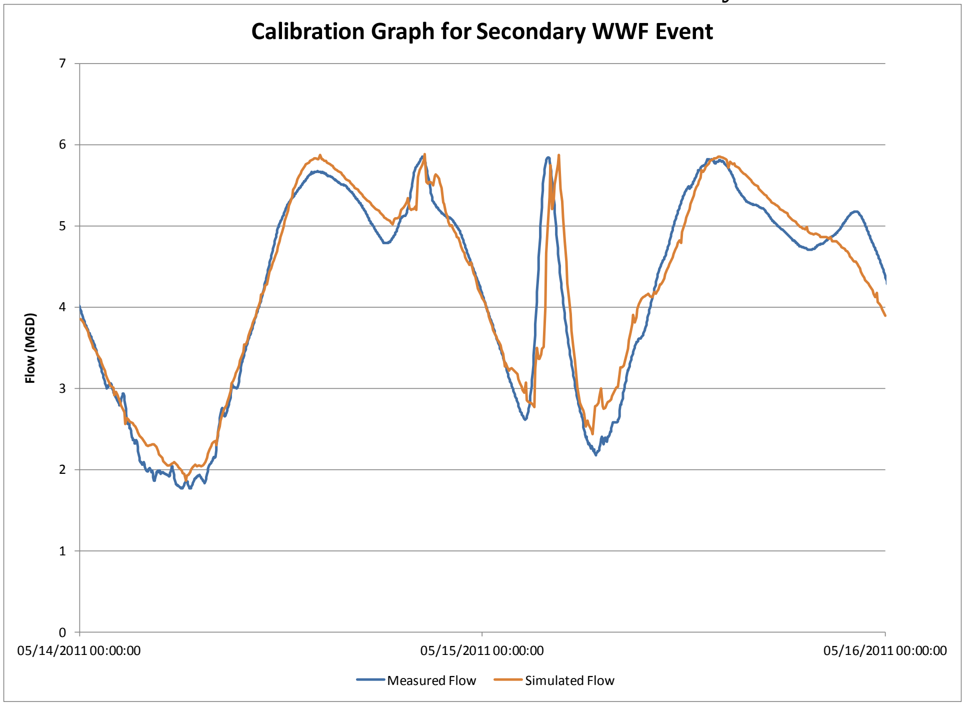
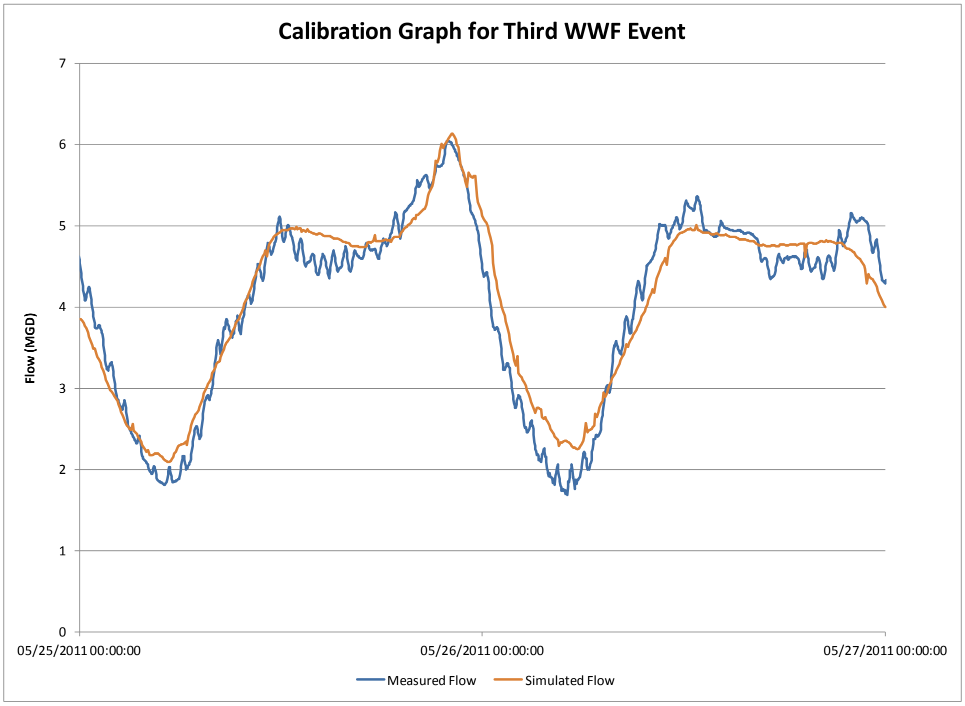


Figure 3-14
Wet Weather Flow Calibration – Third Event

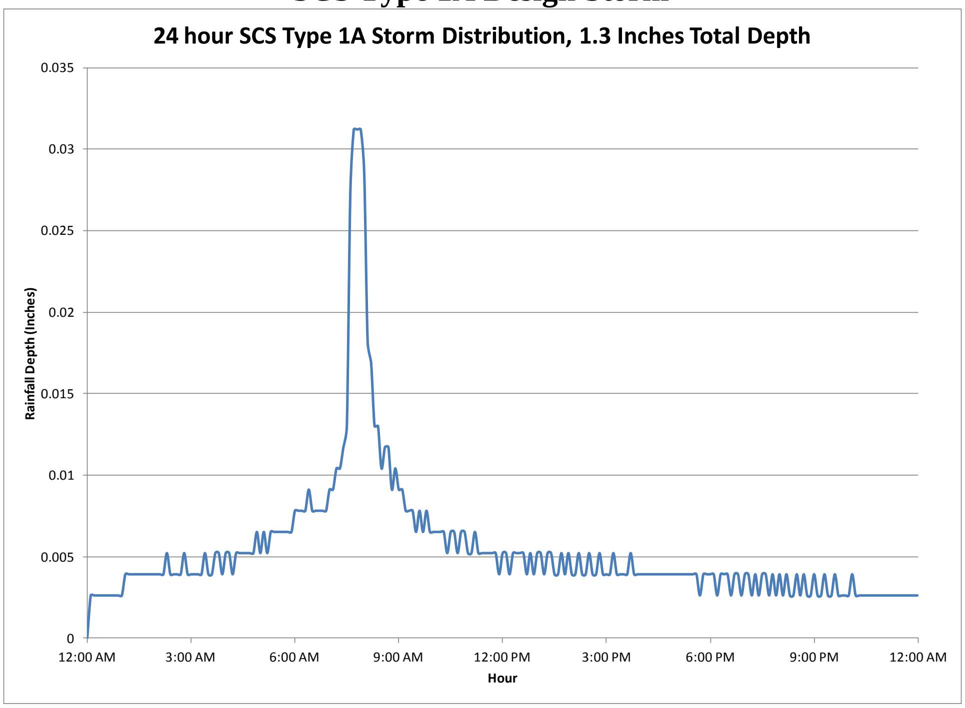


Design Storm

The Eastern Washington stormwater manual indicated that the design storm for the area around the Tri-Cities is a 24 hour SCS Type 1A storm distribution. A Type 1A storm distribution is a typical thunderstorm event common in eastern Washington. The isopluvial indicated that the 10-year, 24-hour storm depth for the City was 1.3 inches.

Figure 3-15 shows a graph of the design storm that was constructed by scaling the SCS Type 1A storm distribution such that the total depth is 1.3 inches. This is the rainfall time series that was attached to the model as input for the design storm simulations.

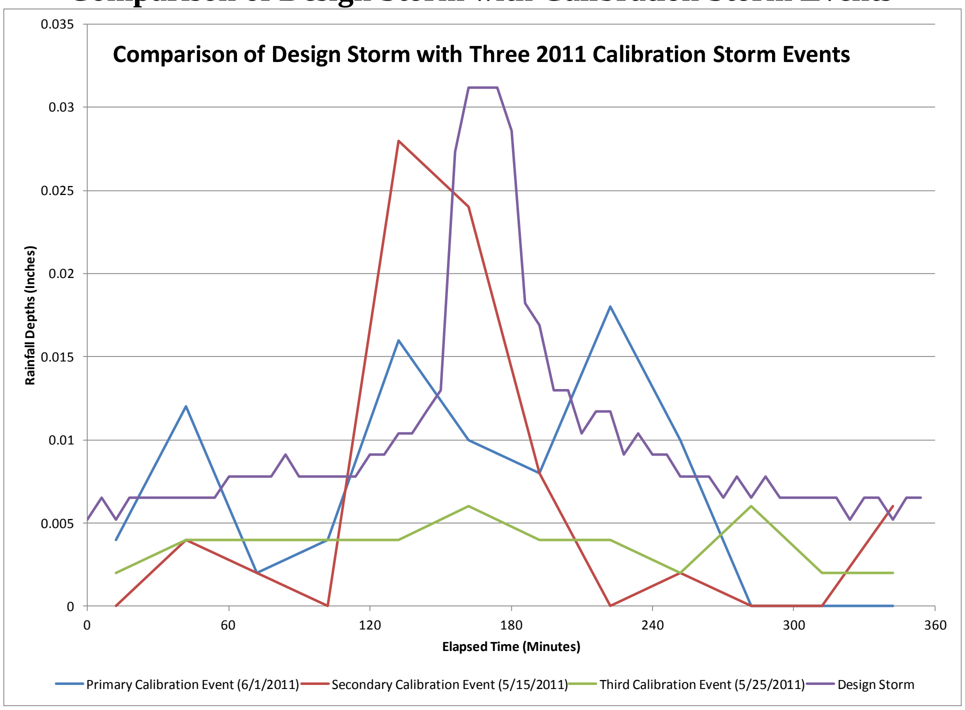
Figure 3-15
SCS Type 1A Design Storm



The peak of the design storm occurs at approximately 8:00 AM, which generally coincides with the diurnal peak for dry weather throughout the collection system. This assumption adds a level of conservancy to the overall deficiency analysis as it assumes the wet weather peak occurs at or near the same time the dry weather peak occurs. Additionally, a comparison of the peak DWFs generated in the calibrated model for weekdays and weekend days indicated that the peak weekend flow was approximately 17 percent higher than the peak weekday flow. Therefore, for wet weather scenario analyses, a 24-hour simulation of a weekend day was run with the design storm rainfall time series attached as loading to the model. This caused the peak wet weather from the design storm to be generated at approximately 8:00 AM on a weekend day, which corresponds to the conservative ssumption for planning purposes that peak wet weather occurs concurrently with peak DWF conditions.

A comparison of the design storm and the three (3) precipitation events used for WWF calibration is illustrated in Figure 3-16. The precipitation data was collected at 30 minute intervals, and the design storm values were for six (6) minute intervals, so for the graph the rainfall data was scaled by a factor of five in order to estimate six (6) minute rainfall intensity values that matched the frequency of the design storm values. This comparison suggests that the design storm has greater intensity than each of the calibration storm events. Additionally, the six (6) hour total depth of the design storm is 0.61 inches, which is larger than the six (6) hour cumulative depth of each of the three (3)calibration events, which were noted previously in Table 3-4.

Figure 3-16
Comparison of Design Storm with Calibration Storm Events



2031 DFW Generation

The 2031 DWFs were generated using population data derived from traffic analysis zone (TAZ) population based projections and a design per capita flow rate of 80 gallons per capita per day (gpcd). This approach differed from the way flows were distributed for 2011 system modeling, which used water billing usage data to characterize the spatial distribution of the loading, and flow monitoring data to determine the magnitude of the loading.
In order to assign the projected TAZ population based flows to the sewer system, the TAZ GIS polygons were compared with the major sewer basin areas. A new GIS layer was created in which the TAZ polygons and major sewer basin polygons were intersected in order to create smaller polygons. The result of this process was a GIS shapefile composed of polygons in which each area identified a subset of each unique TAZ polygon and each sewer

basin. The polygons in this new layer are referred to as "sub-basins" (discussed in the "Wet Weather Flow Generation - Model Loading" previously in this section). These sub-basins, shown in Figure 3-17, provide a means of defining areas in the system that belong to a TAZ area (for assigning future population values), and which also belong to a single major sewer basin.

After creating the sub-basins shapefile, it was necessary to determine how to assign the flow generated from each sub-basin to the model. Each sub-basin was therefore associated with the most downstream model manhole in the portion of the model network that overlapped with the sub-basin. In some cases where there was no single most downstream manhole within the sub-basin, the areas were further refined. In those situations, the sub-basin was divided further into smaller sub-basins until each one (1) overlapped with one (1) single area of the system, allowing it to be associated with a common model node. For the sub-basins located in areas of the system not currently sewered, estimates of how to connect these areas to the system in the future were made after examining other available information, such as land contour elevations.

The projected 2031 population of each sub-basin was based on the 2030 TAZ population distribution. A check was also performed to ensure that the total 2030 population calculated for all sub-basins within a single TAZ polygon was equal to the 2030 population value of that TAZ polygon.

The City Airport property was treated uniquely compared with other areas of the City. The assumption was made through consultation with City staff, that the airport area would have no future residential population growth associated with it, and any TAZ based per capita increase associated with the property was manually redistributed to other sub-basins.

After calculating the 2031 sub-basin populations, a flow rate for each sub-basin was calculated by multiplying the population by the future loading rate of 80 gpcd.

When applying the 2031 DWF estimates by sub-basin to the model, the spatial distribution of the DWF applied for the existing conditions scenario was preserved, where possible. When a sub-basin overlapped with an area of the system that had existing DWF loading applied (based on water billing usage records), it was uniformly scaled such that the new total model DWF in that sub-basin was equal to the total desired DWF amount as calculated from the 2031 population estimate and the 80 gpcd loading rate. When a sub-basin did not overlap with any existing DWF in the model, then the entire 2031 DWF amount was loaded to a manually assigned manhole(s). This manhole(s) was identified as the likely connection location(s) for areas outside of the existing network.

To assign future industrial wastewater flows, a second methodology was used. Industrial areas within the City were defined using current zoning information. Industrial flows were assigned by using a 1,500 gallons per day (gpd) per acre based on the assumptions defined in Section 2. Projected industrial flows were manually assigned to manholes that were identified as likely connection points for areas outside the existing collection network.

2031 Wet Weather Flow Generation

As discussed previously in the "Wet Weather Flow Generation – Model Loading" section of this report, the RTK rainfall-runoff model used to generate model WWF loading requires a "sewershed area" parameter to be defined as input, which is used to scale the magnitude of the generated runoff in the model.

For generating WWF in the existing conditions model, the process used defined sewershed area values for all model manholes that served as connection points to sub-basins that intersected with the 20-foot pipe buffer shapefile. Sub-basins that did not overlap with any significant amount of existing pipe representing areas to be served in the future, but are not currently served, did not generate any WWF to the system. In other words, all WWF loading in the existing conditions model originated from sub-basin areas that are served by the collection system.

However, when defining the WWF loading for the 2031 conditions model scenario, it was necessary to make an assumption about how to incorporate I/I into the collection system from the sub-basin areas not currently served. To accomplish this, first sewershed ratio values were assumed for each of the major sewer basins that did not overlap with any significant amount of the existing collection system (for these major sewer basins it was not possible to calculate a sewershed ratio directly as a ratio of the pipe buffer area to the total basin area). Then, sewershed area values were calculated to create a system-wide value (excluding the airport area) that would be applied to future basins. These sewershed area values were then applied to the model manholes at the identified connection points to the system for each future sub-basin. I/I is assumed to be small for the majority of the system. However, the downtown area is older and based on input from City staff, is assumed to have more I/I from roof drains connected to the sewer. The City is planning to determine and address the direct connection of stormwater facilities to the sewer collection system through the recommended flow monitoring in the downtown area, as identified in the Summary of Collection Deficiencies. The City's intent is to disconnect any direct connection of stormwater facilities to the sewer collection system as they are found.

Table 3-6 lists the sewershed ratios used for the sub-basins within each major sewer basin that generated WWF in the existing and 2031 scenarios. The table also notes whether the ratio value was calculated using an intersection with the 20-foot pipe buffer shapefile, or was based on applying a system-wide average where no collection system currently existed.

Table 3-6
Sewershed Ratios

Basin Name	Existing Condition Scenario		2031 Condition Scenario	
	Sewershed Ratio	Source	Sewershed Ratio	Source
East Service Area	0	Pipe Buffer	0.006	Average
Hillsboro Interceptor	0.018	Pipe Buffer	0.018	Pipe Buffer
North Court St.	0.002	Pipe Buffer	0.1	Average
Northwest Service Area	0	Pipe Buffer	0.1	Average
PRL	0.184	Pipe Buffer	0.184	Pipe Buffer
PSC1	0.116	Pipe Buffer	0.116	Pipe Buffer
PSC2	0.113	Pipe Buffer	0.113	Pipe Buffer
PSC3	0.124	Pipe Buffer	0.124	Pipe Buffer
PSC4	0.15	Pipe Buffer	0.15	Pipe Buffer
PSC5	0.091	Pipe Buffer	0.091	Pipe Buffer
PSC6	0.136	Pipe Buffer	0.136	Pipe Buffer
Road 100 Interceptor	0.159	Pipe Buffer	0.159	Pipe Buffer
Road 40 East Interceptor	0.006	Pipe Buffer	0.006	Pipe Buffer
Road 44 Interceptor	0.113	Pipe Buffer	0.113	Pipe Buffer
Road 68 Interceptor	0.108	Pipe Buffer	0.108	Pipe Buffer
Road 84 Interceptor	0.053	Pipe Buffer	0.1	Average
Sacajawea Park Road Interceptor	0	Pipe Buffer	0.006	Average
Southeast Pasco Trunk	0.014	Pipe Buffer	0.014	Pipe Buffer
West Pasco Trunk	0.053	Pipe Buffer	0.1	Average

System Criteria for Deficiencies and Improvements

The City criteria for determining collection system deficiencies are shown in Table 3-7. This information was developed from applicable industry standards and where applicable the Criteria for Sewage Works Design, Washington State Department of Ecology, which references the "Recommended Standards for Wastewater Facilities."

Table 3-7
Collection System Criteria

Criteria	Dry Weather	Wet Weather
d/D (water depth/diameter), gravity pipeline	≤ 0.8	≤ 1.0
Surcharge clearance in manhole	no surcharging	2.0 feet from rim
Surcharge clearance in shallow manhole (difference between pipe crown elevation and rim elevation is less than 2.0 feet)	no surcharging	0.5 feet from rim
Minimum cleansing velocity, gravity pipeline and force main (considered for new pipelines only, minimum pipe diameter of 8 inches)	2 ft/sec	2 ft/sec
Maximum velocity, gravity pipeline	10 ft/sec	15 ft/sec
Maximum velocity, force main	6 ft/sec*	8 ft/sec*
Lift Station Capacity, firm and total capacity	Peak hour flow must not exceed lift station capacity with largest pump out of service (firm capacity).	Peak hour flow must not exceed lift station pumping capacity with all pumps in service (total capacity, 10-year design storm).

** used as a guideline but will not determine a deficiency in all cases*

System Analysis

InfoSWMM functionality was used to create and store multiple model scenarios pertaining to the model calibration and the subsequent deficiencies analysis.

Once the model calibration process had been completed, the next step was to configure the model for running the deficiency simulations. A number of existing and 2031 dry and wet weather scenarios were set up for the deficiency analysis. The following changes were made to the base "calibrated" model:

- The calibrated DWF was increased by 5 percent, from approximately four (4) MGD to 4.2 MGD, in order to attempt to approximate peak DWF conditions in the design scenarios.

- One (1) MGD of industrial flow was added as a constant load to the East Interceptor at two (2) injection points (0.5 MGD applied to each). This loading was added to evaluate the capacity to serve new industrial customers that will be coming into the system in the near future.

- For the WWF scenario, the SCS Type 1A 10-year design storm was loaded into the model.

In addition to the existing condition design scenarios, alternatives were created in which the DWF and WWF flows were replaced with the 2031 loading. Table 3-8 lists a summary of the total flows applied as input to the model for each of these four (4) system analysis scenarios, as well as the average and peak simulated flows in the model at the WWTP.

Table 3-8
Overview of Model Design Scenarios and Flows

Scenario	Description	Total System Flows Applied as Input to the Model (MGD)				Simulated Flow at WWTP (MGD)	
		Residential DWF	Industrial DWF	WWF	Total	Average	Peak
Existing DWF	DWF increased to 4.2 MGD, to estimate maximum daily flow conditions	4.2	1.4	-	5.6	5.4	8.7
Existing WWF	Existing DWF, with WWF generated from sub-basins that cover the existing collection system	4.2	1.4	1.4	7.0	6.7	12.3
2031 DWF	DWF generated from estimated 2031 population	7.3	4.1	-	11.4	11.2	19.3
2031 WWF	2031 DWF, with WWF generated from all sub-basins (excluding Airport area)	7.3	4.1	1.7	13.1	12.7	23.2

Simulations of these four (4) scenarios were run and the results were checked for the presence of deficiencies. In general, there were very few capacity related deficiencies identified in the analysis under existing or 2031 conditions. This suggests that the collection system is adequately sized to convey existing and future flows in almost all areas of the system. A number of specific deficiencies were found during this analysis and are summarized below.

A number of specific areas in the older downtown area of the City were identified as "approaching" capacity, but were not actually deficient based on the criteria. These areas were discussed with City staff and in many cases the manhole depths were field verified. Two (2) of the overall recommendations are focused specifically on the downtown area; 1) continue collection of survey grade elevation data, and 2) perform focused sewer flow testing. The City has acknowledged that additional data collection and as-built verification should be completed to assess the overall accuracy of elevation data in some areas due to concerns over the various datums used in the past. It is also suspected that the downtown area contains the most opportunities for precipitation induced inflow to enter the system through direct rooftop drain connections and some possible stormwater connections. This area of town also contains the oldest piping in the system, which may be most prone to cracks allowing inflow or even periodic infiltration to enter the system.

Existing Conditions Analysis Results

The following section provides a bulletized list of deficiencies or "watch" areas identified during each specific modeling scenario.

Existing Peak Dry Weather Flow

- Full Pipe Conditions downstream of the Pearl Street Lift Station (Pipes 10450 to 10370), see Figure 3-18. (Deficiency)

Existing Peak Wet Weather Flow

- Full pipe conditions downstream of the Pearl Street Lift Station (Pipes 10450 to 10370) (Deficiency)
- Areas in downtown show full pipe conditions, but no actual surcharging (Watch)

Future (2031) Conditions Analysis Results

2031 Peak Dry Weather Flow

- Full Pipe Conditions downstream of the Pearl Street Lift Station (Deficiency)
- Piping along Road 44 above 0.8 d/D (Deficiency)
- 9th and Washington Lift Station cannot convey peak DWF under firm capacity (Deficiency)
- Maitland Lift Station cannot convey peak DWF under firm capacity (Deficiency)

2031 Peak Wet Weather Flow

- Full Pipe Conditions downstream of the Pearl Street Lift Station (Deficiency)

- Piping along Road 44 and Argent Road show d/D >1.0, but does not overflow (Watch)
- Several pipes upstream of 9th and Washington Lift Station shown with d/D >1.0 (Watch)
- Some areas in downtown show full pipe conditions, but no actual surcharging (Watch)

Lift Station Capacity Analysis

Table 3-9 shows an analysis of the dry and wet weather loadings and the capacities for the existing lift stations. For both 2011 and 2031 conditions, the average DWF, peak DWF and peak WWF was determined from the model simulation results.

For the modeled lift stations, the **bold** flow values shown in the table were extracted directly from the simulation results. The flows for each of the non-modeled lift stations were represented in the model as loading at the points where their force mains connect to the gravity system. These model-loading values were used to estimate the flows for these lift stations.

The capacities listed in Table 3-9 range from the design point flow for a single pump to the sum of the design point flows for all pumps, which is the total pumping capacity. The firm pump capacity represents the capacity of the lift station with the largest pump off line. The actual total capacity will be less than the upper limit of this range. To validate actual flow requires performing flow testing at each lift station.

All City lift stations are adequately sized to convey existing flows. All of the City’s smaller lift stations were found to have adequate capacity to meet the design criteria under 2011 and 2031 conditions. Three (3) of these lift stations appear to be significantly oversized based on the available information presented. The Airport Lift Station serves a small area with limited information on sewer discharges; it is recommended that during future maintenance that flow testing be completed to confirm average and peak flows. The Pennie Avenue Lift Station also serves a small area with limited information on sewer discharges. The Road 84 & Argent Lift Station is a temporary facility with future flows being conveyed to the south within the next 20 years. The over sizing of these lift stations is due to developers sizing for buildout. The flows estimated for these areas represent the short term growth and not the planned build out flows.

The projected 2031 peak DWFs at the main pumping facilities located at Maitland and 9th and Washington, exceed each station's firm capacity. These lift stations will require upgrades as peak DWFs near firm the firm capacity of each station. These upgrades might be considered in conjunction with regular pump related maintenance or replacement in the next 20 years.

Table 3-9
Lift Station Capacity Summary

Name	Total Pumping Capacity (gpm)	Firm Pumping Capacity (gpm)	Average DWF (gpm)		Peak DWF (gpm)		Peak WWF (gpm)	
			2011	2031	2011	2031	2011	2031
Airport	300	150	1	1	1	2	14	14
Road 36 & Burden	750	375	48	146	84	259	96	270
Navy Base	500	250	2	52	3	115	40	124
Pearl St.	1600	800	161	187	248	287	258	296
Pennie Ave.	170	85	9	5	14	8	14	8
Maitland	7,275	4,850	1,450	3,220	2,344	5,784	2,389	5,850
9th and Washington	10,400	6,800	2,519	4,874	3,744	7,296	6,153	9,276
Road 84 & Argent	880	440	3		6		7	
Rivershore	880	440	9	12	12	17	15	37
Three Rivers	1200	600	17	102	29	177	38	338

Modeled Lift Stations are noted in ***Bold***
Capitol Avenue and Commercial/Kahlotus Lift Stations were not included since they are currently not in service.

Condition and Odor Issues

The City is experiencing odor and corrosion problems in specific portions of the collection system. The hydrogen sulfide corrosion has degraded portions of the collection system and is suspected of damage in others. Through on-going closed circuit television and inspection, the City has identified approximately 34,000 feet of collection system piping that should be evaluated. There are two (2) primary sections of concern. The first is along 44th Street from Dradie Street to Sylvester Street continuing along Sylvester Street to Road 36, then along Road 36 and the Columbia River to US 395. This comprises approximately 13,000 feet of primarily 21-inch to 36-inch diameter pipe. The second section of piping is the main interceptor along the river between I-182 and Road 64, which comprises 21,000 feet of 18-inch to 36-inch diameters. See Figure 3-19 for the location of these areas within the City.

Typical causes of hydrogen sulfide corrosion in sewers are associated with warmer seasonal temperatures coupled with slow moving sewage that allows anaerobic bacteria to reduce sulfate ions to sulfide ions, creating hydrogen sulfide gas. Corrosion occurs when the hydrogen sulfide reacts with moisture in the crown of the pipe resulting in sulfuric acid that attacks concrete pipe and manholes. The hydrogen sulfide gas also has a rotten egg smell that can result in odor problems in areas were the gas is at elevated concentrations.

Summary of Deficiencies

The following is a summary of the deficiencies that were identified through the hydraulic capacity simulations. Section 6 will address the summary of the alternatives analysis and recommendations for these deficiencies.

Table 3-10
Summary of Collection Deficiencies

Location	Description of deficiency	Timeframe
Gravity Line Downstream of Pearl Street Lift Station	Dry weather d/D > 1.0 as a result of inadequate gravity collection system capacity	Existing deficiency
Argent Road and Road 44 Interceptor	Dry weather d/D > 1.0 as a result of inadequate gravity collection system capacity	By 2031 or as development dictates
9th and Washington Lift Station	Inadequate Firm Capacity	By 2031 or as development dictates
Maitland Lift Station	Inadequate Firm Capacity	By 2031 or as development dictates

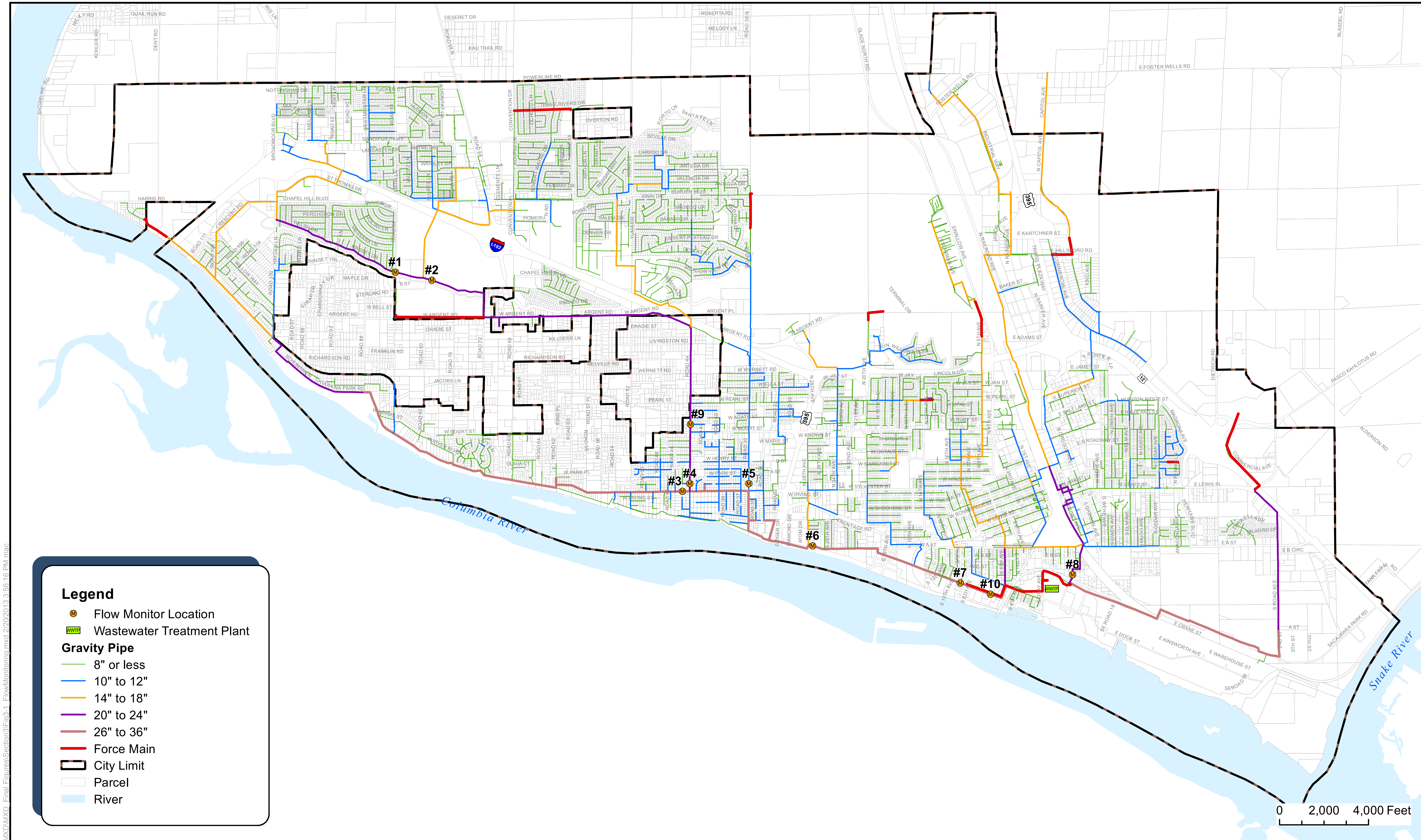
In addition to the defined deficiencies the following is a summary of recommendations for consideration for the City. These recommendations include gathering additional information to help further access the capacity and condition of the collection system in the future.

1. Complete additional flow monitoring at specific locations in the system under wet weather conditions including the purchase of flow monitoring equipment that could be moved throughout the system or used for long-term monitoring at specific locations. Initial efforts should focus on identifying the wet weather response (I/I) in the downtown area. This effort should focus on locating and removing any direct connection to the sewer collection system by stormwater facilities.

2. Perform flow tests as part of additional flow monitoring at each lift station to identify firm and total pumping capacity.

3. Collect the remaining manhole and pipe inverts that were interpolated for this project using survey grade equipment. Update the hydraulic model with the complete survey data. Consider a longer-term project to collect inverts and rims on all system manholes and pipes.

4. Develop GIS layers for collection system information that will assist in the City to better manage the collection system infrastructure.



MSA Murray, Smith & Associates, Inc.

CITY OF PASCO

Comprehensive Sewer Plan

Figure 3-1
Flow Monitoring Locations

February 2013 11-1261

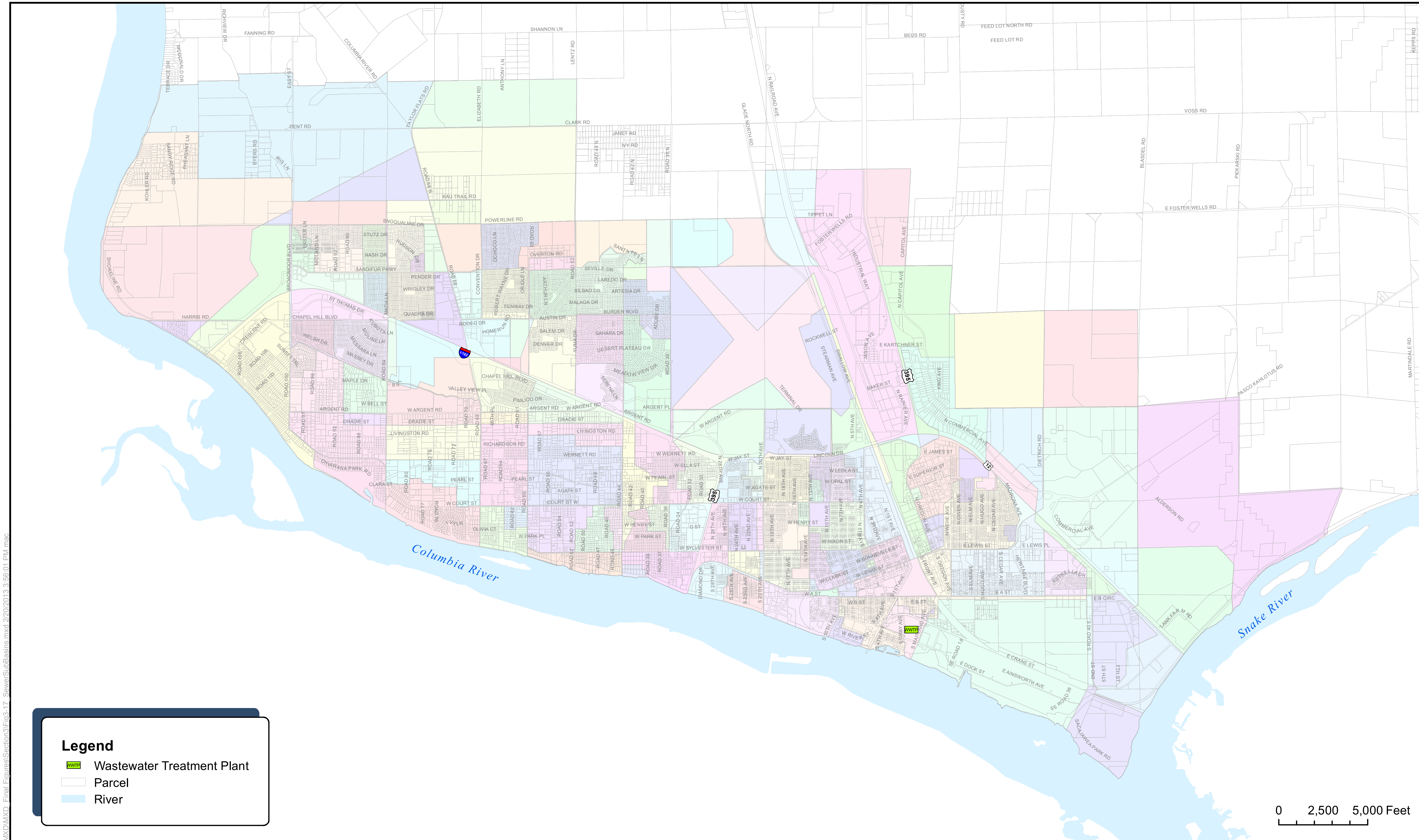


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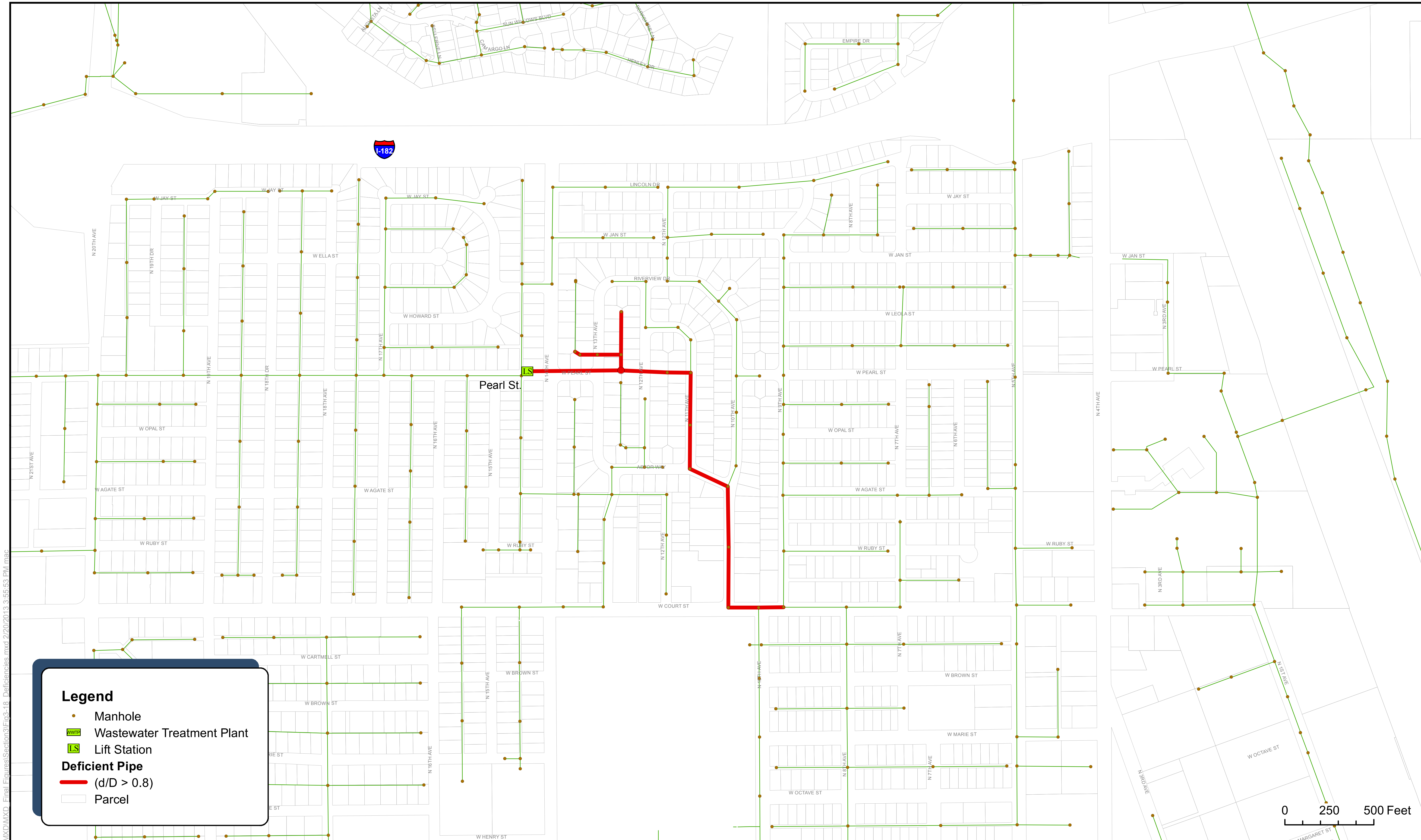
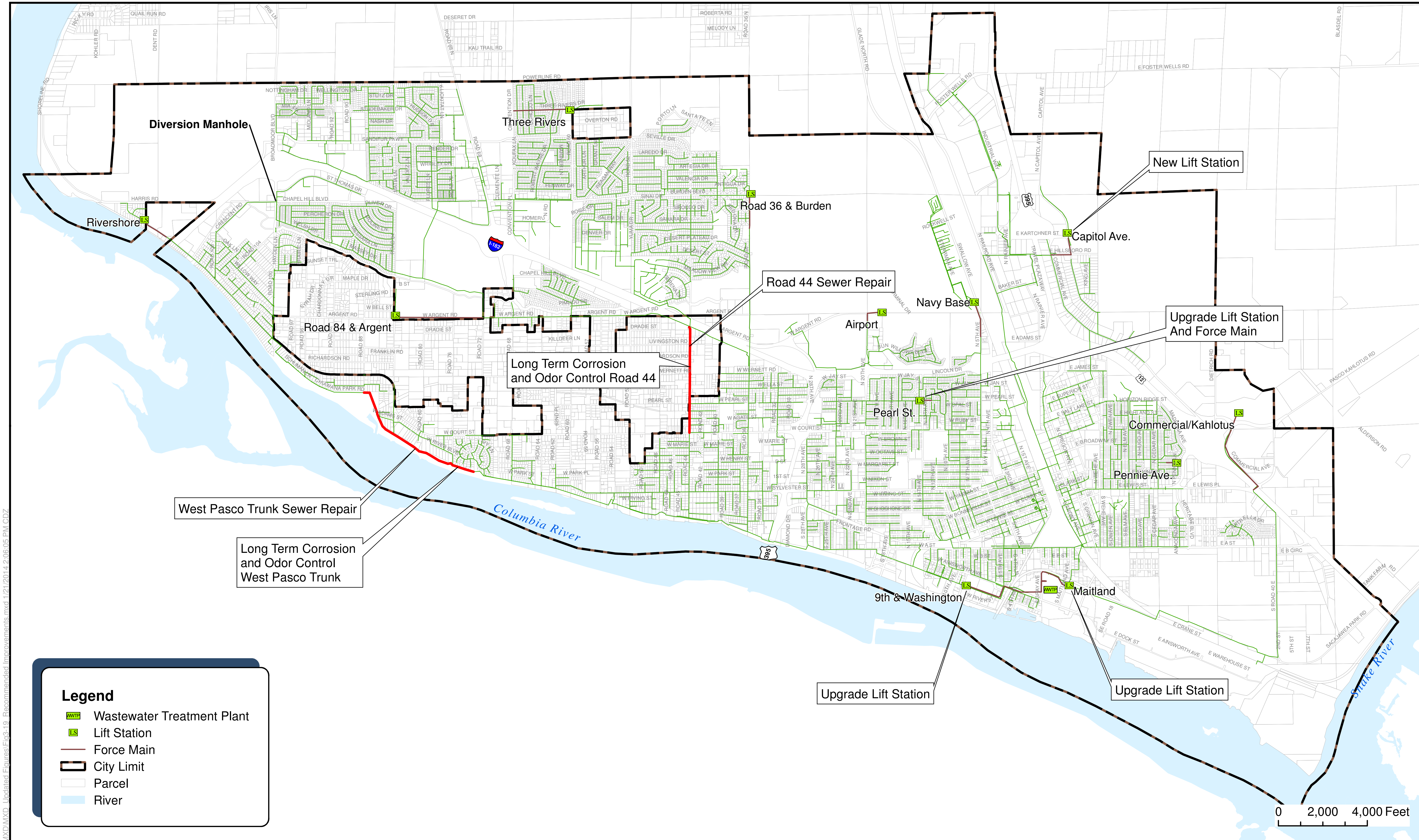
Figure 3-17
Sewer Sub-Basin Areas



Comprehensive Sewer Plan

Figure 3-18
Surcharging of Existing Conditions



Comprehensive Sewer Plan

Figure 3-19
Collection System
Capital Improvement Projects

January 2014 11-1261

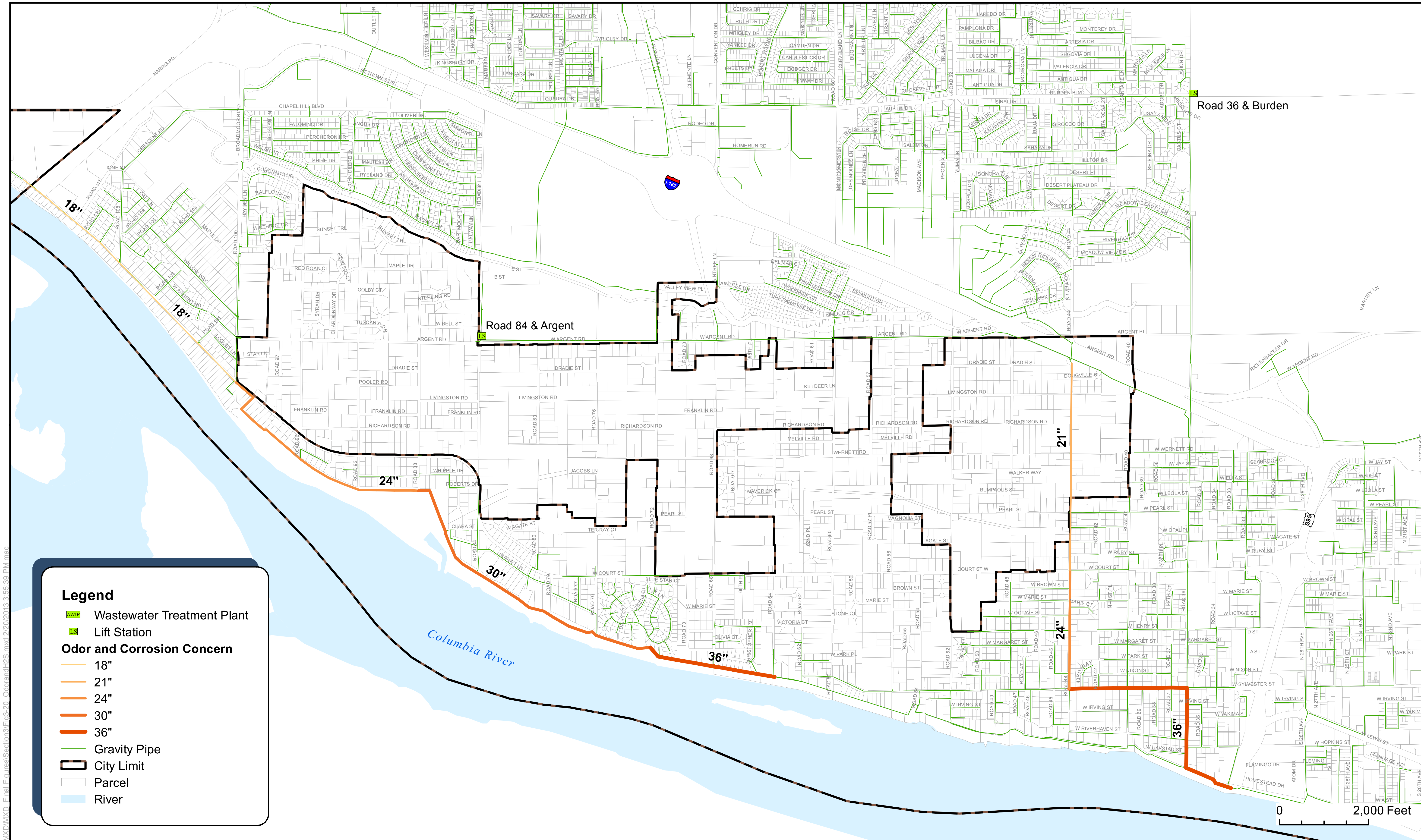


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Figure 3-20 Areas of Odor and Corrosion Concern

February 2013 11-1261

Section 4

SECTION 4
WASTEWATER TREATMENT CAPACITY ASSESSMENT

Introduction

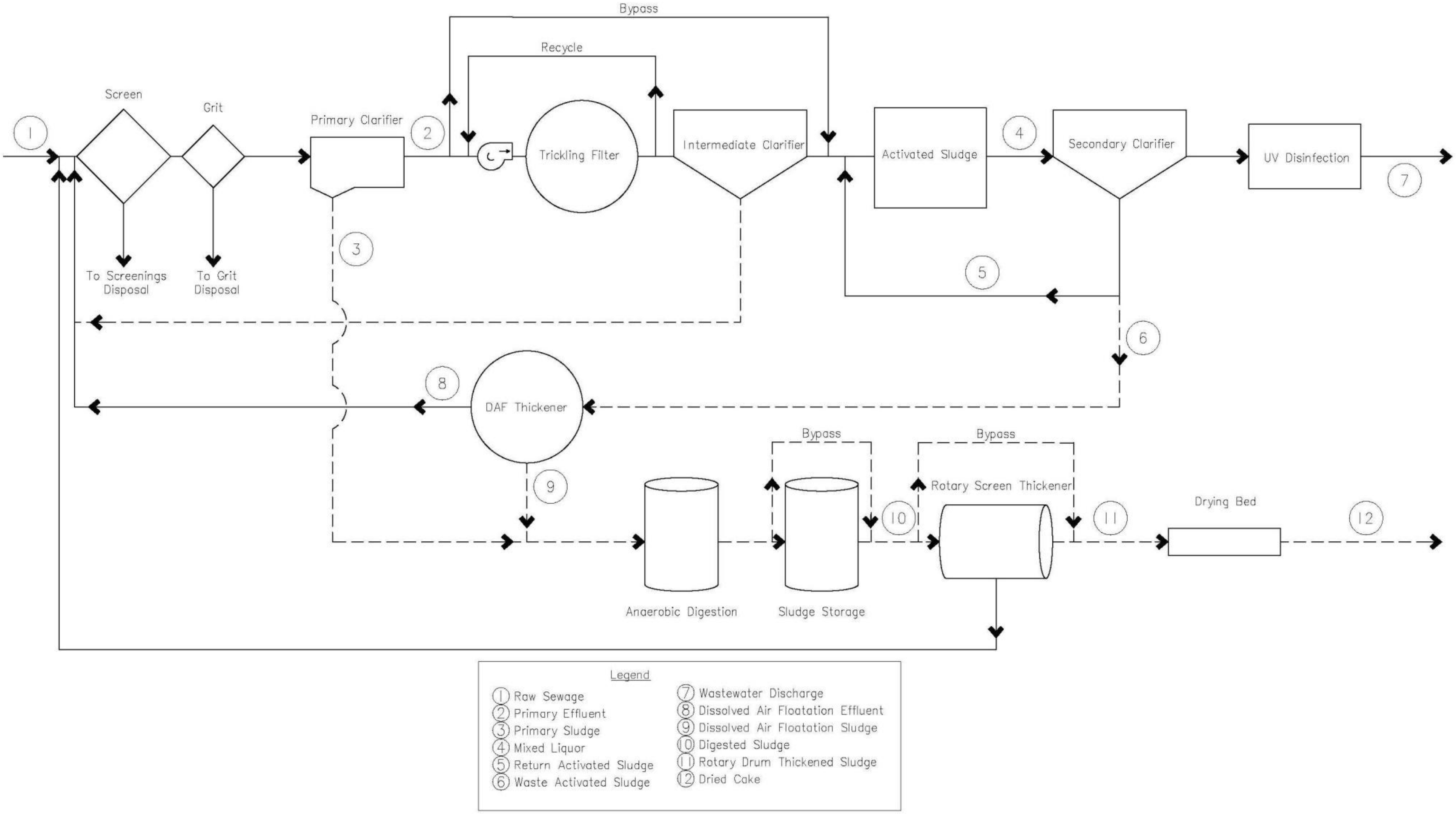
This section presents a summary of the capacity analysis performed for the City of Pasco's (City) existing municipal wastewater treatment plant (WWTP). This analysis was based on previous WWTP capacity analysis by HDR Engineers augmented by a review of individual treatment process loadings, overall system hydraulics and state redundancy requirements.

The results of this review are presented below, organized into the three (3) limit classes that we investigated - 1) unit process, 2) hydraulic and 3) reliability/ redundancy limits. The resulting existing WWTP capacity estimate is summarized at the end of this section.

Existing Treatment Process

The existing WWTP processes are grouped into three (3) main treatment categories: primary, secondary, and solids treatment. All of the treatment groups comprise unit processes that carry out distinct functions necessary for the treatment of the City's raw wastewater. A description of the unit processes and functions are presented in Section 1. A process flow schematic of the City's existing WWTP is provided in Figure 4-1.

Figure 4-1
City of Pasco WWTP Schematic



Unit Process Capacity

This section presents the methodology and results of the unit process capacity evaluation completed for the City's WWTP. Individual unit processes and treatment systems were evaluated using industry standard design criteria to identify performance and capacity limits. Typical design standards from the following references were used to review and estimate unit process performance and/or capacity limits.

- "Criteria for Sewage Works Design." (2008). Washington State Department of Ecology (Ecology), Olympia, WA, aka "Orange Book".
- "Manual of Practice No. 8, ASCE Manual and Report on Engineering Practice No. 76, 5th Edition, Design of Municipal Wastewater Treatment Plants" Water Environment Federation, Alexandria, VA and American Society of Civil Engineers, Reston, VA.
- Metcalf and Eddy, Inc., Tchobanoglous, G., Burton, F.L., and Stensel, H.D. (2003). "Wastewater Engineering Treatment and Reuse," 4th Edition, McGraw-Hill, New York, NY.
- "10 States Standards: Recommended Standards for Wastewater Facilities", 2004 Edition. Health Research Inc., Albany NY.

The performance and capacity assumptions used were reviewed against existing information (daily monitoring and process control reports) to check their accuracy. A plant mass balance approach was then used to predict unit process and overall WWTP loadings above existing flows and loads.

The design criteria used in the process capacity analysis are summarized in Table 4-1.

Table 4-1
Unit Process Design Criteria

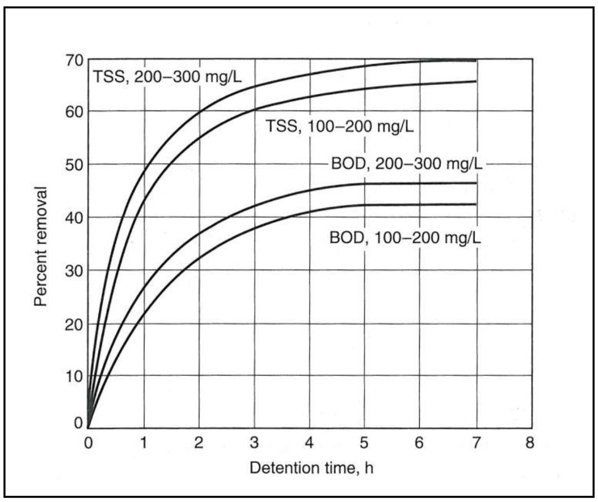
Unit Process	Parameter	Capacity Limit	Source
Screens	Maximum Flow Rate, each	10.3 mgd	Manufacturer Limit
Grit Chamber	Maximum Flow Rate, each	7.5 mgd	Manufacturer Limit
Primary Clarifiers	Overflow Rate, Average	1,000 gpd/ft^2	Orange Book, M&E
	Overflow Rate, Peak	2,500 gpd/ft^2	Orange Book, M&E
Trickling Filter	BOD Loading	70 lb-BOD/1,000 ft^3/day	M&E, WEF MOP 8, Plant Operations/Design*
Intermediate Clarifier	Overflow Rate, Average	550 gpd/ft^2	M&E, WEF MOP 8
Aeration Basins	Mixed Liquor Suspended Solids	≤ 2,000 mg/L	Plant Operations/Design*, 10 State Standards
	Solids Retention Time (SRT)	≤ 3 days	Plant Operations/Design*
	BOD Loading	65 lb-BOD/1,000 ft^3/day	M&E, WEF MOP 8, Plant Operations/Design*
Aeration System	Blower Capacity	14,550 scfm	Manufacturer Limit
	Diffuser Grid Capacity	13,376 scfm	Manufacturer Limit
Secondary Clarifiers	Solids Loading Rate, Average	22.5 lb/sf/day	M&E, WEF MOP 8
	Overflow Rate, Peak	1,200 gpd/ft^2	Orange Book, M&E
UV Disinfection	Flow Rate	21 mgd	Manufacturer Limit
DAFT	Solids Loading Rate	19.2 lb/sf/day	M&E, Orange Book
Anaerobic Digestion	Hydraulic Residence Time	30 day total/15-day firm	Orange Book, M&E, CFR 503
Rotary Screen Thickener	Maximum Flow Rate, each	200 gpm	Manufacturer Limit
Drying Bed	Solids Loading Rate	20 lb/ft^2/year & 20% min Dry Solids	Orange Book, M&E

** Capacity limit listed influenced by existing facility operation and/or original design basis.*

To evaluate the potential capacity of the existing WWTP, a mass-balance analysis of the City's existing operational scheme (non-nitrifying) was used along with the design criteria in Table 4-1, and the future flow peaking factors and constituent concentrations in Table 2-8. January 2012 influent and process results were used for the calibration as this data coincides with supplemental data collected by City staff, at Murray, Smith & Associates, Inc.'s request, on primary clarifier and trickling filter performance. Based on this calibration, initial mass balance assumptions were modified to account for observed differences in primary clarification removal efficiency, trickling filter biochemical oxygen demand (BOD) removal and solids generation. The following is a summary of the calibration adjustments that were made.

- The removal performance in the primary clarifier was decreased to match calibration time period results. To adjust the primary clarifier performance for higher flows, primary clarifier BOD and total suspended solids (TSS) removal performance was adjusted from the calibration point as a function of hydraulic retention time consistent with published performance curves for rectangular clarifiers (see Figure 4-2). As the detention time increases, the ability for solids to settle increases, as does the BOD and TSS removal performance. Conversely, as detention time decreases, solids do not settle as well and performance decreases.

Figure 4-2
Primary Sedimentation Tank Performance



(Metcalf and Eddy, 2003)

- The Natural Research Council equation was used to model trickling filter removal performance. To more closely match the actual removal rates during the calibration time period, the effective depth of the trickling filter was decreased. The City's trickling filter is deeper than typical rock media filters and often, the effective depth of rock media trickling filters is limited to less than its full depth. By modeling the trickling filter with an effective depth of six (6) feet versus the actual depth of eight (8) feet, the predicted performance aligns with actual performance.

- The biomass yield in the aeration basins were adjusted up from the initial model assumptions to more accurately align with observed sludge wasting and the relatively young sludge age used by the City at their WWTP.

The results of the process capacity analysis are summarized in Table 4-2. Each treatment process capacity was evaluated under flow/load conditions, average annual (AA), max month (MM), or peak hour (PH), consistent with the capacity parameters listed in Table 4-1. The results are presented in **bold**. Since different flow/load conditions are used to determine the capacity of the various unit processes, the flow peaking factors listed in Table 2-8 were then used to adjust the results to common flow measures (AA, MM and/or PH) for comparison purposes. These values are shown in *italics*.

For example, the capacity of the screens and grit chambers is based on PH flows. To compare their capacity to the average overflow rate capacity of the primary clarifiers, the screen and grit chamber PH values are divided by the Table 2-8 PH/AA peaking factor of 1.76.

Table 4-2
Unit Process Capacity Results
in million gallons per day (MGD)

Unit Process	Parameter	No. Units	AA	MM	PH
Screens	Flow	3	*17.6*	*19.1*	**30.9**
Grit Chambers	Flow	2	*8.2*	*8.9*	**14.4**
Primary Clarifiers	Overflow Rate, Average	2	**5.5**	*6.0*	*9.6*
	Overflow Rate, Peak	2	*7.8*	*8.5*	**13.7**
Trickling Filter System	BOD Loading	1	*2.9*	**3.2**	*5.1*
Aeration Basins	MLSS & SRT	2	*7.3*	**7.8**	*12.9*
	BOD Loading	2	*7.1*	**7.7**	*12.4*
Aeration System	Blower Capacity	5	*10.8*	**11.8**	*19.0*
	Diffuser Capacity	3344	*10.6*	**11.5**	*18.6*
Secondary Clarifiers	Solids Loading Rate, Avg	2	*10.3*	**11.2**	*18.1*
	Overflow Rate, Peak	2	*9.7*	*10.5*	**17.0**
UV Disinfection	Flow Rate	2	*11.2*	*12.2*	**19.7**
DAFT	Solids Loading Rate	1	*6.8*	**7.5**	*12.0*
Anaerobic Digestion	Hydraulic Residence Time	2	*8.5*	**9.3**	*15.0*
Rotary Screen Thickener	Solids Loading Rate	1	*21.1*	**23.0**	*37.1*
Drying Beds	Solids Loading Rate	17	*8.4*	**9.2**	*14.8*

Based on these results, with all unit processes online, the aeration basins (7.1 MGD AA flow) were determined to be the limiting unit process from a treatment performance perspective. Other unit processes were shown to have a lower capacity, but were not considered to control the overall WWTP treatment performance as discussed below.

- The primary clarifier capacity, under existing conditions, is not considered limiting because the secondary treatment process has the ability to absorb and treat the higher BOD concentrations resulting from a primary clarifier overload. This overloading of the primary clarifiers is accounted for in the Table 4-2 capacity rating for the secondary treatment system.

  However, the addition of primary clarification capacity is given a priority in the future.

- The capacity listed for the trickling filter is not considered limiting, as the trickling filters are not relied on solely for secondary treatment. The trickling filter is only one (1) part of the WWTP's existing secondary treatment system as its effluent is further treated in the aeration basin. The use of the trickling filter in this manner is accounted for in the Table 4-2 capacity ratings for both the trickling filter and the aeration basins.

- The dissolved air floatation thickener (DAFT) is limited by the solids loading rate (calculated with two (2) aeration basins online, 2,000 mg/L MLSS, and three (3) day mean cell residence time). The process is not considered limiting because unthickened and/or partially thickened waste activated sludge (WAS) can be sent directly to the digesters on a short-term basis. The capacity of the DAFT system can also be significantly increased with the addition of polymer.

Hydraulic Capacity Analysis

This section of the technical memorandum presents the methodology and results of the hydraulic capacity evaluation completed for the City's WWTP. Since the existing National Pollutant Discharge Elimination System permit expresses the design capacity of the WWTP in terms of the AA flow and the hydraulic analysis was based on peak instantaneous (PI) flow, the flow peaking factors in Table 2-7 were again used to convert the hydraulic capacity assessment back to an AA and MM basis for comparison purposes.

To determine the hydraulic capacity of the City's WWTP, the gravity and pump station conveyance elements of the WWTP were analyzed separately, as described below.

Gravity Conveyance

Hydraulic modeling of the gravity conveyance systems at the WWTP from the headworks to the effluent flume utilized a commercially available software program, Visual Hydraulics, to simulate plant structures, develop flow scenarios and identify areas of hydraulic concern. Visual Hydraulics utilizes a traditional method for analyzing water surface profiles. Specifically, a downstream control point is established, enabling calculation of the hydraulic profile upstream of that control point. Hand calculations and field observations were then used to further verify potential hydraulic restrictions.

WWTP record and design drawings were used to construct the initial hydraulic model. The model used available information to best replicate current plant features and dimensions of a facility that has undergone several expansions and upgrades. Initial review of the model included a comparison to historical plant design hydraulic profiles. After refinement, the model, in its final form, was utilized to estimate the flow capacities associated with various flow conditions at the WWTP. For the gravity conveyance analysis, capacity was determined when water levels rose to a point that containment was compromised (less than 6-inches of freeboard) or plant operations were determined to be adversely impacted.

The analysis of the gravity conveyance within the plant did not discover any hydraulic bottlenecks that control plant capacity beyond that already identified in the unit process capacity analysis.

Outfall

While exact record drawings for the outfall piping and diffuser were not available, enough information was able to be gathered from other City plans and documents to allow an outfall analysis. With the outfall piping operating in both open channel and pressure pipe flow conditions, the hydraulics of this system were modeled using Environmental Protection Agency's SWMM software.   The results of this modeling show that at a peak hour flow of approximately12.3 MGD, the effluent flume will become submerged.

Pump Station Conveyance

There are a total of five (5) pump stations at the City's WWTP that are considered important to the plant's hydraulic and/or treatment capacity. The initial capacity rating of each facility was based on the stated capacity of each facility with the largest pump out of service (firm capacity) and was coordinated with the process capacity analysis. The following is a brief description of these pump stations and their associated capacity assessments.

Primary Sludge Pump Station

The four (4) piston style primary sludge pumps each have a stated maximum capacity of 96 gpm. Currently, the pumps are operated intermittently to allow sludge to accumulate and thicken in the primary clarifier. Assuming only two (2) pumps in operation for eight (8) hours, the WWTP's primary sludge pumping is considered adequate for AA plant flows up to 17.1 MGD.

Intermediate Clarifier Sludge Pump Station

The two (2) 7.5-hp intermediate clarifier sludge pumps are piston pumps, each with a capacity of 96 gpm. The pumps are set to start on a timer and run for approximately 6.5 hours per day. This station is sufficient to convey collected solids, with one pump off-line, without limiting the capacity of the trickling filter.

Trickling Filter Recirculation Pump Station

The Trickling Filter Recirculation Pump Station is comprised of two (2) 150-hp vertical turbine pumps, each with a rated capacity of eight (8) MGD. The trickling filter recirculation pumps convey primary effluent and trickling filter recycle flows to the top of the trickling filter. Typically, only one (1) pump is in operation at any given time and is sized sufficiently to not limit the capacity of the trickling filter system.

Return Activate Sludge (RAS) Pump Station

The RAS pump station includes three (3) 25-hp pumps, each with a rated capacity of 3,000 gpm. Assuming a RAS return rate of 60 percent of the incoming flow, the capacity of this facility, with one pump off-line, is equivalent to an AA WWTP influent flow of 14.40 MGD.

WAS Pump Station

The WAS pump station is the final pump station that was reviewed as part of the capacity assessment. This pump station includes three (3) pumps, each with a rated capacity of 120 gpm. WAS is typically pumped 24 hours per day and the average flow rate in 2011 was 51 gpm. With one (1) pump off-line, this system is capable of handling the WAS pumping requirements associated with an AA WWTP influent flow of 17.9 MGD.

Hydraulic Analysis Results

Within the WWTP, our analysis did not identify any significant gravity or pump system conveyance bottlenecks that would limit the previously described process capacity assessment. Future capacity improvements at the WWTP, however, are assumed to require upgrades to the plant's hydraulic conveyance capacity as well.

The outfall piping and diffuser, however, were identified to have a hydraulic limit of approximately 12.3 MGD PH that equates to an AA flow rate of seven (7) MGD.

Reliability and Redundancy Capacity Analysis

This section of the technical memorandum presents the results of the reliability and redundancy evaluation that was completed for the City’s WWTP. As defined by Ecology’s *Criteria for Sewage Works Design*, the City WWTP must meet Class I reliability requirements due to its effluent discharge to the Columbia River. The associated unit process and equipment loading reliability requirements is summarized in Table 4-3 below, specific to the City’s facilities.

Table 4-3
Process Capacity Results

Flow Basis	Flow & Load Factor	Redundancy and Reliability Requirements	Source	Existing City WWTP Status
Mechanical Bar Screen	PIDF Flow	Backup unit/manual cleaning capabilities	Table G2-9	Pass - With largest screen offline, the reliability and redundancy limit is 11.7 mgd, AA basis
Grit	PIDF Flow	None listed	None	NA
Primary Clarifier	PH Flow & Load	With the largest-flow-capacity unit out of service, the remaining units should have a design flow capacity of at least 50 percent of the total design flow.	Table G2-9 & T2-2.2.9	Pass - City has two primary clarifiers. The reliability and redundancy limit is 5.5 mgd, AA basis.
Trickling Filter	MW Flow MD Load	With largest unit out of operation, the remaining units shall have capacity of at least 75% of total design flow.	Table G2-9	Pass - With Trickling Filter offline, Aeration Basins become the remaining secondary treatment process. At an AA flow of 7.1 mgd the aeration basins provide over 75% of BOD removal
Trickling Filter Recycle PS	MW Flow MD Load	Backup pump required. With one unit out of operation, the remaining pumps will have the capacity to handle the peak flow.	Table G2-9	Pass *See Hydraulic Capacity Analysis*
Intermediate Clarifier	PH Flow & Load	None listed	None	NA
Aeration Basin	MW Flow MD Load	At least two equal-volume basins shall be provided.	T3-6.2.1A	Pass
Aeration Blowers	PH Load	With largest unit out of service, design oxygen transfer shall be maintained.	Table G2-9	The reliability and redundancy limit is 8.6 mgd, AA basis.
Air Diffusers	NA	With largest section out of operation, oxygen transfer shall not be impaired.	Table G2-9	The reliability and redundancy limit is 9.1 mgd, AA basis.
Secondary Clarifier	PH Flow & Load	With largest unit out of operation, the remaining units shall have capacity of at least 75% of total design flow.	Table G2-9	The reliability and redundancy limit is 6.5 mgd, AA basis.

Flow Basis	Flow & Load Factor	Redundancy and Reliability Requirements	Source	Existing City WWTP Status
UV Disinfection	PI Flow	With largest unit out of operation, the remaining units shall have capacity of at least 50% of total design flow.	Table G2-9 & T5-2.2.3	Pass The reliability and redundancy limit is 11.2 mgd, AA basis.
Primary Sludge Pumps	MD Load	Backup pump required. With one unit out of operation, the remaining pumps will have the capacity to handle the peak flow.	Table G2-9	Pass *See Hydraulic Capacity Analysis*
Intermediate Sludge Pumps	MD Load	Backup pump required. With one unit out of operation, the remaining pumps will have the capacity to handle the peak flow.	Table G2-9	Pass *See Hydraulic Capacity Analysis*
RAS Pumps	NA	Backup pump required. With one unit out of operation, the remaining pumps will have the capacity to handle the peak flow.	Table G2-9	Pass *See Hydraulic Capacity Analysis*
WAS Pumps	NA	Backup pump required. With one unit out of operation, the remaining pumps will have the capacity to handle the peak flow.	Table G2-9	Pass *See Hydraulic Capacity Analysis*
DAFT	MD Load	None listed		NA
Rotary Screen Thickener	MD Load	None listed		NA
Anaerobic Digesters	MD Load	None listed		NA
Sludge Holding Tank	MD Load	None listed		NA
Drying Beds	MD Load	None listed	S-2.1.6 & Table S-3	NA
Electrical Power	NA	Two separate sources or works-based generators.	G2-8.3 & Table G2-10	Pass (Two separate power grids are available to power the WWTP)

Overall Capacity Assessment Results

Table 4-4 provides a summary of the existing capacity analysis results for each unit process and identifies whether the capacity rating is based on design criteria, hydraulic, or reliability and redundancy limits. All values are shown in terms of AA sewer flow and assume flow BOD, TSS and nutrient concentrations are similar to existing flows.

Table 4-4
Overall Capacity Results

Unit Process	Limiting Factor	AA Flow Limit
Primary Clarifiers	Design Capacity	5.5 mgd
Secondary Clarifiers	Reliability & Redundancy	**6.5 mgd**
DAFT	Design Capacity	6.8 mgd*
River Outfall	Hydraulic Capacity	7.0 mgd
Secondary Treatment (Trickling Filter and Aeration Basins)	Design Capacity	7.1 mgd
Grit Removal	Design Capacity	8.2 mgd
Drying Beds	Design Capacity	8.4 mgd
Anaerobic Digestion	NA	8.5 mgd
Aeration System (Blowers and Diffusers)	Reliability & Redundancy	8.6 mgd
Screens	NA	≥ 11.2 mgd
RAS Pumps	NA	≥ 11.2 mgd
UV Disinfection	NA	≥ 11.2 mgd
Primary Sludge Pumps	NA	≥ 11.2 mgd
WAS Pumps	NA	≥ 11.2 mgd
Rotary Screen Thickener	NA	≥ 11.2 mgd

* increased capacity may be possible if changes made to allow polymer addition but would not increase redundancy

Based on the results of this study, the primary clarifiers were determined to have the lowest rated capacity (5.5 MGD). However, since the secondary treatment system can handle the overloading of the primary clarifiers, they do not presently limit the overall rating of the plant. Taking the overloaded performance of the primary clarifiers into account, the aeration basins were found to limit the WWTP's capacity to an AA flow of 7.1 MGD with all systems on-line and operational. When the reliability and redundancy requirements in Ecology's *Criteria for Sewage Works Design* are factored in, the secondary clarifiers limit the capacity of the City's existing WWTP to an annual average flow of 6.5 MGD. Table 4-5 provides the BOD and TSS and nutrient loadings associated with this capacity limit.

Table 4-5
Estimated WWTP Capacity Limit

Load	Units	Annual Average
Flow	mgd	6.5
BOD	lb/day	14,960
	mg/L	276
TSS	lb/day	15,775
	mg/L	291

MSA

Section 5

SECTION 5
OPERATIONS AND MAINTENANCE

Introduction

This section summarizes the City of Pasco's (City's) sewer collection system and wastewater treatment plant (WWTP) operations and maintenance (O&M) program and reviews State and Federal requirements that impact the City's O&M program. Comments, observations and recommendations to improve the efficiency and effectiveness of the City's O&M program are provided at the end of this section. Key O&M elements that have the potential to impact the City's Capital Improvement Program (CIP) are carried forward and further discussed in the following sections.

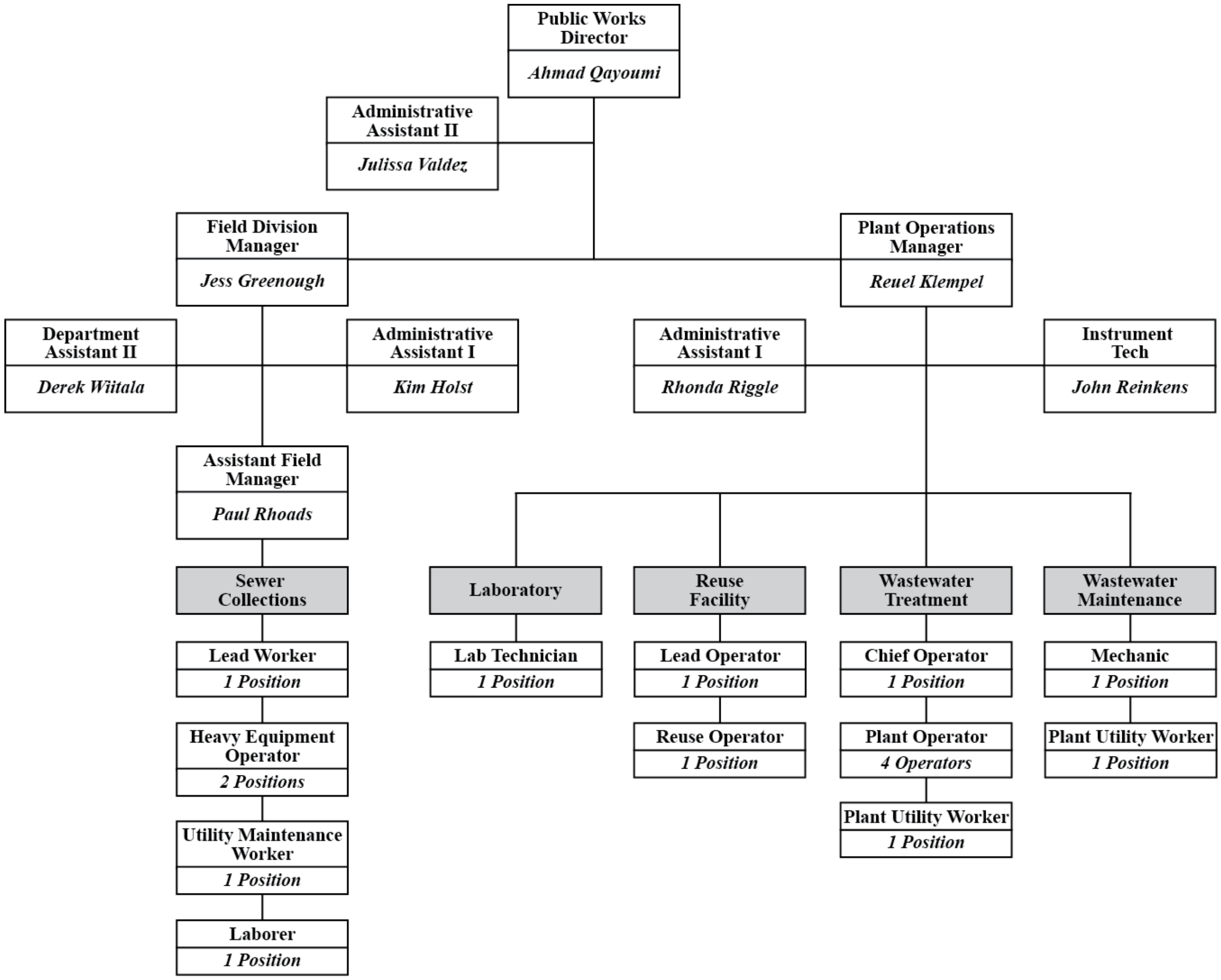
Regulatory Compliance

Under the Federal Clean Water Act of 1972, and amendments of 1977, 1981 and 1987, the Environmental Protection Agency has given the State of Washington Department of Ecology (Ecology) authorization to permit WWTPs that discharge to waters of the state under the National Pollutant Discharge Elimination System (NPDES) program. Ecology has issued NPDES Permit 0044986-02 to the City's WWTP, Appendix A, and this document includes O&M requirements.

Utility Management and Structure

The City's sewer collection system and WWTP maintain 14 full-time equivalent (FTE) staff, as of 2011, for O&M. The WWTP and sewer collection system operate within the Public Works Department under the City Public Works Director, Mayor and City Council. The utility organizational structure is shown in Figure 5-1.

Figure 5-1
2012 Public Works Personnel Organization Chart



Operator Certification

The sewer collections unit consists of five (5) FTEs and is responsible for the O&M of all City owned sanitary sewer pipelines. The wastewater treatment unit consists of nine (9) FTEs and is responsible for the O&M of the City's WWTP and 10 active sewer lift stations. The sewer collection system and WWTP operators' work hours are Monday through Friday, 7:00 am to 3:30 pm. Two (2) after-hours operators, one (1) sewer collection system and one (1) WWTP, are on call outside the normal work hours. The on-call operators are responsible to handle calls and alarms, and take the required action as necessary.

As stipulated in the City's NPDES Permit, the City must have an operator in charge responsible for the day-to-day operation of the WWTP certified by the State of Washington for at least a Class III plant. An operator certified for at least a Class II plant must be in charge during all regularly scheduled shifts. The WWTP has six (6) certified operators. Operator certification is shown in Table 5-1.

Table 5-1
Operator Certification

Certification	Wastewater Treatment Unit	Sewer Collection Unit
I	0	0
II	3*	0
III	2	1
IV	0	0

Note: As of November 2012
** City currently has one (1) vacant position.*

Wastewater System Operations

The City operates and maintains a sewer collection system that contains nearly 1.3 million feet of pipe, over 3,000 manholes and 10 lift stations. The City also operates and maintains an activated sludge process wastewater treatment facility, with a capacity of 6.5 mgd and which treats on average 3.83 million gallons per day (mgd) of sewage with a peak flow of 7.23 mgd. As part of the treatment plant operation, the City manages a biosolids program that processes and land applies the municipal sewage sludge from the treatment process in accordance with State and Federal guidelines and requirements.

To meet NPDES operating requirements and to protect the public against any health hazards, the City must operate the wastewater system proactively. O&M goals are to maintain a program that uses preventative and proactive measures to keep the system operating cost effectively.

Operations & Maintenance Manual

As required by the NPDES permit, the City maintains an O&M manual onsite, which is reviewed annually with any updates being reviewed by Ecology. The City is required to follow the instructions and procedures of this manual.

The WWTP O&M Manual provides basic O&M information for the City WWTP in accordance with Ecology, *Operation and Maintenance Manual Guidelines for Wastewater Treatment Plants*. It describes the treatment process in sufficient detail to familiarize personnel with both the normal operation of the plant as well as the alternate methods of operation that are available. In addition, it provides an overview of all miscellaneous components and management systems in use at the plant. The intent of the manual is to assist operators and other personnel with learning the overall operation of the plant, to serve as a basic reference for operating any of the system's components and provide emergency response and safety guidelines.

Responsibility for the O&M of the City's lift stations is covered by the City's Plant Operations group. The current WWTP O&M Manual does not include these lift stations. It is recommended that the City expand its WWTP O&M Manual to include lift stations to provide for a central location for this information to be maintained.

Routine Maintenance and Repairs, and Emergencies

The City maintains a list of various maintenance projects that have been identified for repair in the sewer collection system. The reasons for these projects include cracked pipe, offset joints, deep bellies, service repairs, separated joints, service caps, line repairs, pinched gaskets and manhole repairs. These minor repairs are completed by City staff, while the major repairs are bid for contractors to perform. For maintenance repairs, the City has budgeted $25,000 / year to keep the sewer collection system maintained. It is recommended that the City review this yearly maintenance budget to confirm it provides the needed resources to keep the sewer collection system maintained for continued long-term high level of service.

The City actively maintains the WWTP to keep critical components in good operating condition. This includes inspecting machinery, cleaning tanks and equipment and preventative maintenance. The City maintains a spare parts inventory as required to provide for routine maintenance and repair of systems and provide the facility with redundant components.

The City maintains capital reserves that can be used for emergencies or unanticipated repairs beyond what would be considered routine maintenance or repairs. Capital reserves fluctuate from year to year, depending on operating revenues and expenditures, but are routinely greater than one million dollars per year.

Cleaning/Jetting and Closed Circuit Television (CCTV) Inspection

Sewer cleaning and inspection are vital to maintaining a well working sewer collection system. With time, deterioration, solids-buildup, blockage and collapses can become a serious problem. Proactive maintenance through cleaning and inspection keeps the sewer collection system working and many serious problems from occurring. The City currently performs pipe cleaning/jetting and CCTV inspection in-house. The City began a CCTV inspection program in 2005 and the whole system was inspected in six (6) years. Figure 5-2 presents a map of the areas that have been inspected during the first six (6) years of the program.

Figure 5-3 presents the City's planned CCTV inspection schedule. The City's program will go from East to West and start at the upstream ends of each of the basins. This allows for jetting, which is completed along with the CCTV inspection, to flush downstream through the sewer collection system. Reasons for inspection include routinely scheduled inspections, warranty inspections, new construction inspections and other special projects inspection.

Additionally, the system is jetted during inspections to remove grease, roots, sand, grit, and debris that can cause blockages and odor issues. See Table 5-2 for summary of CCTV and cleaning/jetting.

Table 5-2
CCTV and Cleaning/Jetting Summary

Year	Jetting (lf/year)	Percentage of System	CCTV (lf/year)	Percentage of System
2010	511,000	40%	266,000	21%
2011	407,000	32%	238,000	19%
Goal	500,000	39%	250,000	20%

Low velocities within sewers inhibit the transport of solids through the system to the treatment plant and commonly contribute to the buildup of debris. To assist the City in identifying potential problem areas in the collection system, Figure 5-4 indicates the current areas within the collection system that are currently experiencing low flow velocities, less than two (2) fps, for pipe 12 inches and larger. Figure 5-5 identifies areas within the collection system that will continue to experience low velocities well into the future.

These segments of the collection system with low velocities are typically the result of oversized sewers designed to accommodate future flows. As growth continues to occur flows will increase and velocities will improve. During the yearly cleaning/jetting program, it is recommended that the City use this information to evaluate the condition of the pipe segments in these areas to determine if they require more frequent cleaning/jetting to remove deposits.

System Monitoring and Control

The City employs a supervisory control and data acquisition (SCADA) system to monitor, record and control functions within the WWTP and out in the collection system. The SCADA system uses Wonderware software.

The sewer collection system includes 10 active lift stations, only three(3) have data acquisition without control: Road 36, Pennie Avenue and Pearl Street. The City is currently considering adding remote control to Road 36 and Pearl Street lift stations. The other seven (7) lift stations in the sewer collection system have SCADA. Within the WWTP, SCADA is used throughout the process to monitor, control and record data with respect to equipment operation, flow measuring, level indications, system performance, alarm history and permit compliance.

Safety Procedures and Emergency Response Program

The WWTP and Sewer Collections do not have individual Safety and Emergency Procedures. The two (2) divisions fall under the general Public Work Policy and Procedure Manual. The individual documents for the Safety Procedures Manual and Emergency Response Program are briefly described below. The focus of the program is for the protection of staff during O&M activities.

Bloodborne Pathogens Exposure Control Policy and Procedure Program

The purpose of the Bloodborne Pathogens Policy and Procedure Program is to protect City Public Works Department employees from bloodborne pathogens and make available the hepatitis B vaccine and vaccination series to all employees who have occupational exposure. The section of this policy includes Exposure Control and Prevention, Handling and Decontamination, Personal Protective Equipment, Training, Medical Evaluation and Medical Records.

Confined Space Policy and Procedure Program

The Confined Space Policy and Procedure Program establishes a uniform procedure and maintains control of all entries into confined spaces. This procedure states the requirements that are to be followed by all City Public Works Employees when entering a confined space. This procedure identifies the hazards and practices that involve a confined space entry.

Heat Related Illness (HRI) Policy and Procedure Program

WAC 296-62-09530, Heat-Related Illness in the Outdoor Environment, requires employers to create a written HRI Prevention Program. The City has written the HRI Policy to comply with the WAC program. The policy includes requirements for annual training, preventative controls, and trigger temperatures for when HRI precaution must be taken.

Hoisting and Rigging Policy and Procedure Program

The purpose of this procedure is to ensure that rigging hardware, slings and hoisting equipment are properly inspected, stored and maintained prior to use. This procedure states the requirements that are to be followed by all City Public Works Employees when using hoisting and rigging equipment.

Pesticide Policy and Procedure Program

The Pesticide Policy and Procedure Program is intended to protect employees who work with pesticides. This policy applies to employees who handle, mix, formulate, transfer and store pesticides. It includes handling, disposal, storage and respiratory protection measures.

Respiratory Protection Policy and Procedure Program

The Respiratory Protection Policy and Procedure Program protects employees from adverse health effects when exposed to harmful air contaminants in excess of the permissible exposure limits and oxygen deficient atmospheres. The program is administered by the Safety/Environmental Regulations Specialist within the Public Works Department and covers use of respirators, training, record keeping, and program evaluation.

Sanafoam Vaporooter Policy and Procedure Program

The Sanafoam Vaporooter II Policy and Procedure Program minimizes employee exposure to Sanafoam Vaporooter II products. The program is administered by the Safety/Environmental Regulations Specialist within the Public Works Department. Sanafoam Vaporooter II is a chemical herbicide root control product used in sewage collection systems. The program covers use of respirators, training and records.

Trenching and Shoring Policy and Procedure Program

The Trenching and Shoring Program provides basic safety requirements for work in and around excavations and the prevention of potential excavation hazards. This program applies to all City employees and is in accordance with WAC 296-155-Part N. It provides responsibility to supervisors, competent persons and employees through procedures, protective systems, inspections, training and record keeping.

Arc Flash Policy and Procedure Program

The Arc Flash Program is intended to protect employees from electrical shock, burns and arc blast/flash. The program includes training and safe work practices for work that is performed near or on electrical equipment that could create an arc flash.

Engineering Design Standards and Specifications

The City maintains design standards, which define material and design details required for all sewer system improvements. These included standard details and specifications that supplement the WSDOT Standard Specifications for Road, Bridge and Municipal Construction, current edition, including applicable APWA Amendments as adopted by the City. These standards are to be used on all City CIPs and development projects located within the jurisdiction of the City. These standards can be found on the City’s website.

The City has established a plan submittal and review process for subdivision construction plans, with requirements defined in the City Municipal Code Title 13 Water and Sewers.

Record Keeping and Reporting

The City is required to monitor and report in accordance with the NPDES permit. The specific requirements are defined in the NPDES permit, which is found in Appendix A. As part of the permit, the City staff record, summarize, report and submit data obtained at the WWTP. This task is lead by the WWTP lab technician, who ensures compliance with certified laboratory regulations and related laws. The WWTP lab technician prepares and maintains quality assurance and quality control manual and documents quality control procedures and performs data management including retention of laboratory data, assures that the lab complies with laws concerning chemical hygiene and safety. Sampling and testing by plant operators is also reviewed to ensure that it complies with appropriate standards and procedures. The City also retains the recorded data and reports permit violations (if any). The City's SCADA system provides facility operational records that are monitored and recorded.

It is recommended that the City consider the potential value of purchasing a maintenance management software package. These software packages provide for valuable recording and monitoring of data that is collected as part of ongoing O&M activities. This typically improves operational efficiencies by having this information readily available to staff and developing a more systematic preventive maintenance program.

Pretreatment Program

The City is just starting to implement a pretreatment program, taking over the current pretreatment permits that Ecology is managing. The pretreatment program requirements are discussed in detail in Section 2. The pretreatment program will require the addition of staff to address the required coordination for monitoring of commercial and industrial dischargers to the sewer collection system. Responsibilities of the program would include managing the permitting process, sampling, monitoring, lab coordination, local, state and federal regulation review, and special investigations for illegal or non-permitted discharges.

Flow Monitoring

Flow monitoring offers an effective method for identifying the location and quantity of infiltration and inflow (I/I) occurring within the sewer collection system. The City currently does not have a flow-monitoring program or maintain flow-monitoring equipment. As recommended in Section 3, flow monitoring in the older downtown area of the sewer collection system will allow for the determination of any I/I issues that may existing.

Implementing a flow-monitoring program will provide the City with the following benefits, in addition to the determination of I/I areas. Information from flow monitoring can be used in conjunction with the City's sewer collection system model to determine magnitude and frequency of flows. This will aid in the planning and design of new facilities, so that they can meet the anticipated growth of the expanding service area without being over or undersized.

Public Outreach

Customer Complaints

The City maintains a log of customer complaints/issues in an Excel spreadsheet through dispatch. Over the past 10 years, the City has received on average 28 dispatches per year related to issues in the sewer collection system. There were 31 dispatches in 2011 as of October. The City inspects the sewer collection system in the area of the reported issues and will CCTV the sewer pipeline to determine what is causing the issue. If there is an accumulation of solids in the sewer creating a blockage the City will jet the sewer pipeline. Based on investigated complaints over the past 10 years, all backups have been attributed to the customers lateral and not backup of the sewer pipeline.

Customer Education

The City currently maintains a customer education program in informing customers about keeping fats, oils and greases out of the sewer. There are not specific requirements in the NPDES permit for customer education but with the development of a Pretreatment Program this will need to be expanded to include educational information for commercial and industrial discharges to the City's sewer system, notifying users of applicable pretreatment standards and requirements.

The proper disposal of post consumer products is a key issue facing all wastewater systems. From non-woven wipes to paints and solvents, these products can affect the operation, performance and effluent quality of the wastewater collection and treatment system. It is recommended that the City consider expanding the current educational program to include post consumer products and other hazardous wastes.

Of particular emphasis should be products that could contain contaminants that may have future regulatory limits. Contaminants such as PCBs and pharmaceuticals will be difficult and costly to treat. Preventing these types of products from entering the waste stream will be the most cost effective approach, yet this will require a high level of understanding and participation by the general public.

Staffing Requirements

As noted earlier in this section, the sewer collection system and WWTP have 14 FTEs. The staff are assigned to operate and maintain the sewer collection system, lift stations, and treatment plant. The current level of staffing appears to be adequate to operate and maintain the current system, but the City is operating with fewer staff than comparable cities and national averages. In 2011 the City paid almost $50,000 in overtime within the sewer utility, this has been the trend over the past several years and the City is planning on this being the trend going forward, based on proposed budget estimates. The need for additional staff will grow as the system expands, wastewater flows increase and regulatory requirements become more stringent through the planning horizon.

To review the City's staffing requirements a comparison survey of current staffing levels at similar municipal utilities was completed. Table 5-3 summarizes this information by the different municipal entities. Additionally, the *Water Environment Foundation Manual of Practice No. 8* and the *Water Pollution Control Federation Manual of Practice No. 7* were reviewed to determine the average staffing for similar size systems based on national information. These two (2) sources indicate that based on current population of 50,000 to 100,000 and wastewater treatment facilities with six (6) mgd of capacity; the average staffing is 30 FTE. This is 16 FTEs for the sewer collection system and 14 FTEs for the wastewater treatment system.

Table 5-3
Sewer Collection and Treatment Staffing Comparisons

Municipal Entity	Population	Sewer Main (miles)	Number of Lift Stations	Average WWTP Flows (mgd)	Treatment Process	Number of Sewer Collection Staff	Number of WWTP Staff	SIU*	Pre-treatment Staff
Pasco	50,839	242	10	3.8	Activated Sludge/Solids Handling - Drying Bed/ Mechanical	5	9	2	1
Richland	48,580	252	14	5.0	Activated Sludge/Solids Handling - Mechanical	7	9	11	2
Kennewick	68,570	247	15	5.2	Activated Sludge/Solids Handling - Lagoon	6	4	1	1
Pocatello	54,810	250	23	6.9	Activated Sludge/Solids Handling - Lagoon	6	9	5	3
Idaho Falls	57,646	266	26	10	Activated Biological Tower/Activated Sludge with Liquid Solids Storage& Disposal	10	26	7	1

* *Significant Industrial User*

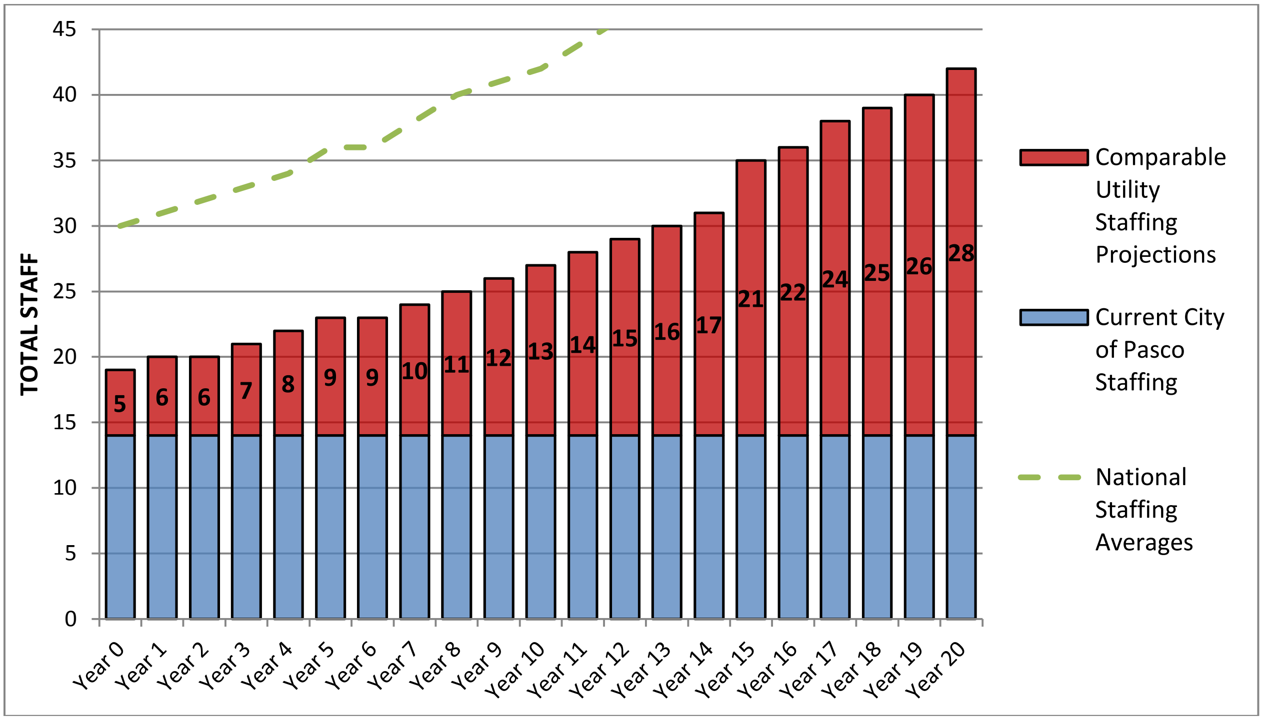
Additionally, Table A-1 of Appendix 4 of the City's WWTP O&M Manual summarizes staffing requirements over a 20-year period (1198-2018). No sources were provided for this information, based on this information the current anticipated staffing level is 24.5 FTEs. Though this is slightly lower than the national average, it assumed that these numbers are based on similar information referenced above.

As indicated by the national staffing numbers and those of comparable utilities, the City is operating at a lower staffing level. The City is able to meet current NPDES requirements and ongoing O&M needs at this staffing level. However, as indicated, the City is currently spending approximately $50,000 in overtime within the sewer utility, highlighting that current staff are stretched to meet the requirements of the system. Additionally, the City has indicated that the single IT staff and lab tech, support other City departments limiting their ability to support the needs of the sewer collection and wastewater treatment facilities. This highlights the need for the City to review staffing needs in detail to determine the need to add additional staff.

The City will be adding an additional FTE for the new pretreatment program. Table 5-3 provides a summary of pretreatment staff and the number of signification industrial users (SIU). Based on how other utilities are currently staffing their pretreatment programs, adding one (1) FTE to cover these duties for the City appears to be appropriate.

To meet the need for growth within the City, additional staff are required to provide for an efficient and smooth operation of the sewer collection system and WWTP. Figure 5-6 shows the estimated staffing requirements over the next 20 years based on the staffing trends from the *Water Environment Foundation Manual of Practice No. 8* and the *Water Pollution Control Federation Manual of Practice No. 7*, this will provide the City with a guide based on current population projections and system growth.

Figure 5-6
Wastewater System Staffing Comparison and Projection



Conclusions and Recommendations

This report makes the following conclusions and recommendations based on a review of the City O&M practices:

- Use the low velocity information, Figures 5-4 and 5-5, to evaluate the condition of the pipe segments in these areas and determine if they require more frequent cleaning/jetting to remove deposits.

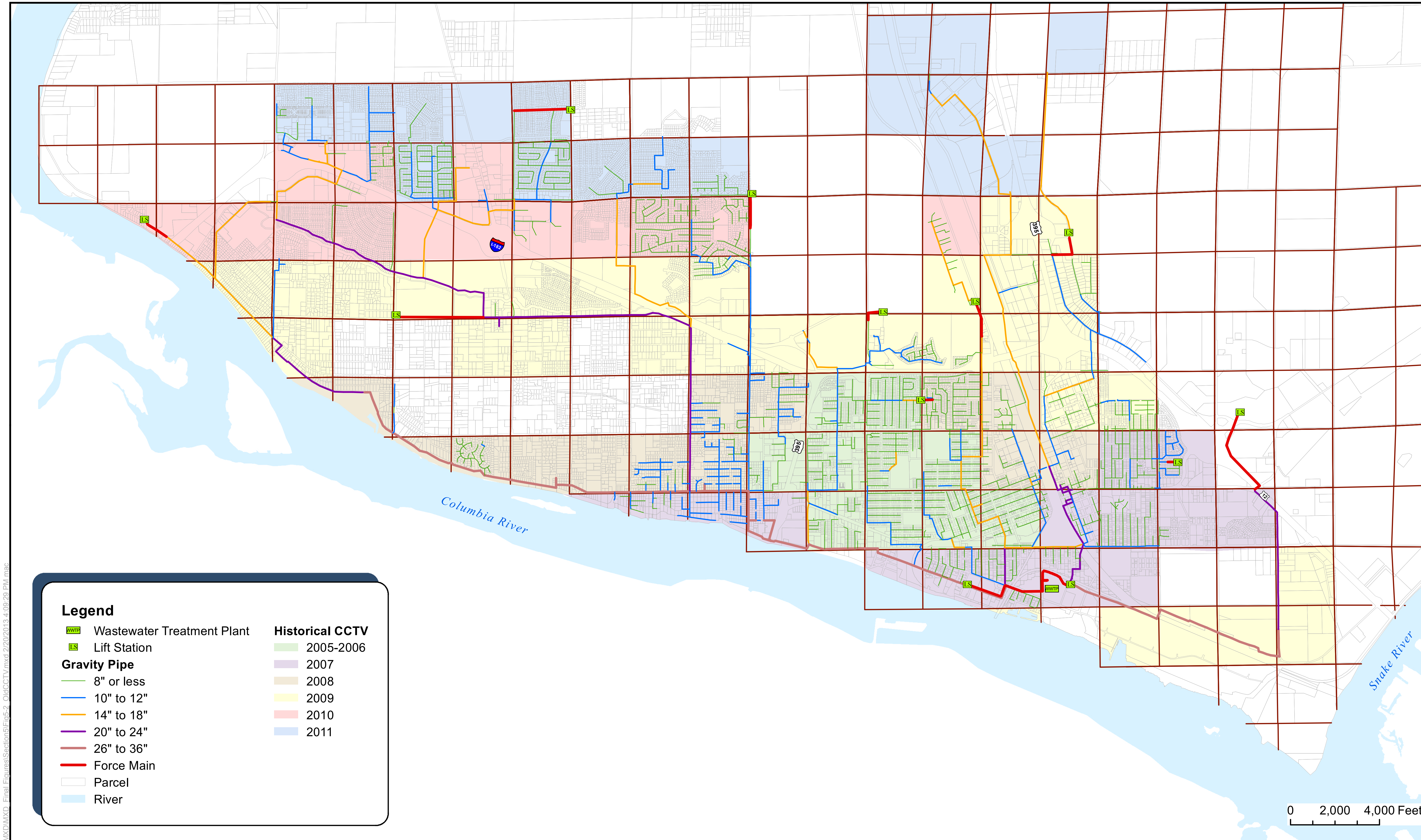
- Expansion of the WWTP O&M Manual to include information for the City's active lift stations.

- The City needs to review the yearly maintenance budget to confirm it provides the needed resources to keep the sewer collection system maintained for continued long term high level of service.

- The City should review the benefits of a maintenance management software package, to provide for valuable recording and monitoring of data that is collected as part of ongoing operation and maintenance activities.

- Flow monitoring in the older downtown area of the sewer collection system to identify I/I issues that may exist.

- Review staffing needs as the City begins the pre-treatment program and to meet the needs of a growing system and future regulatory requirements.

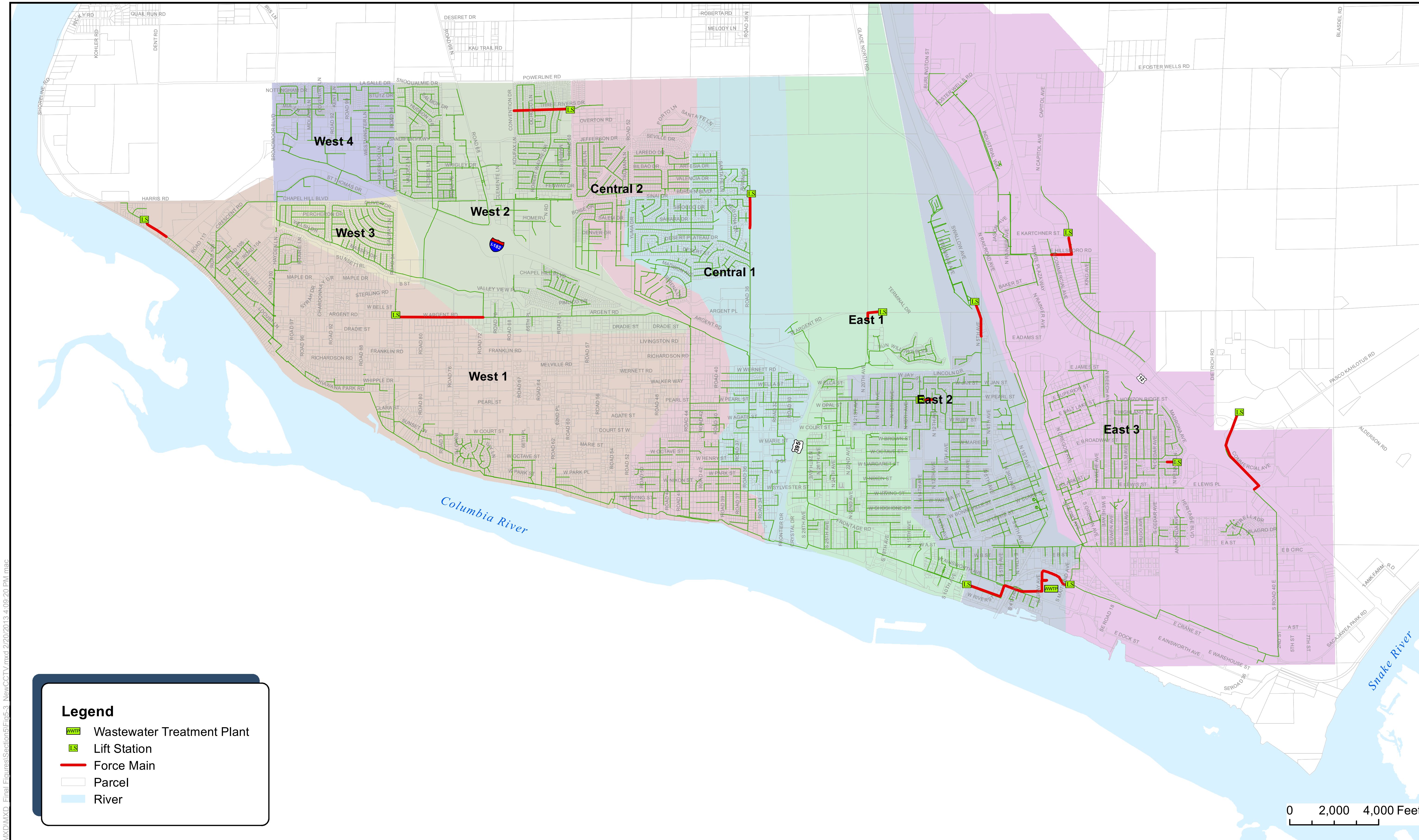


MSA Murray, Smith & Associates, Inc.

CITY OF PASCO

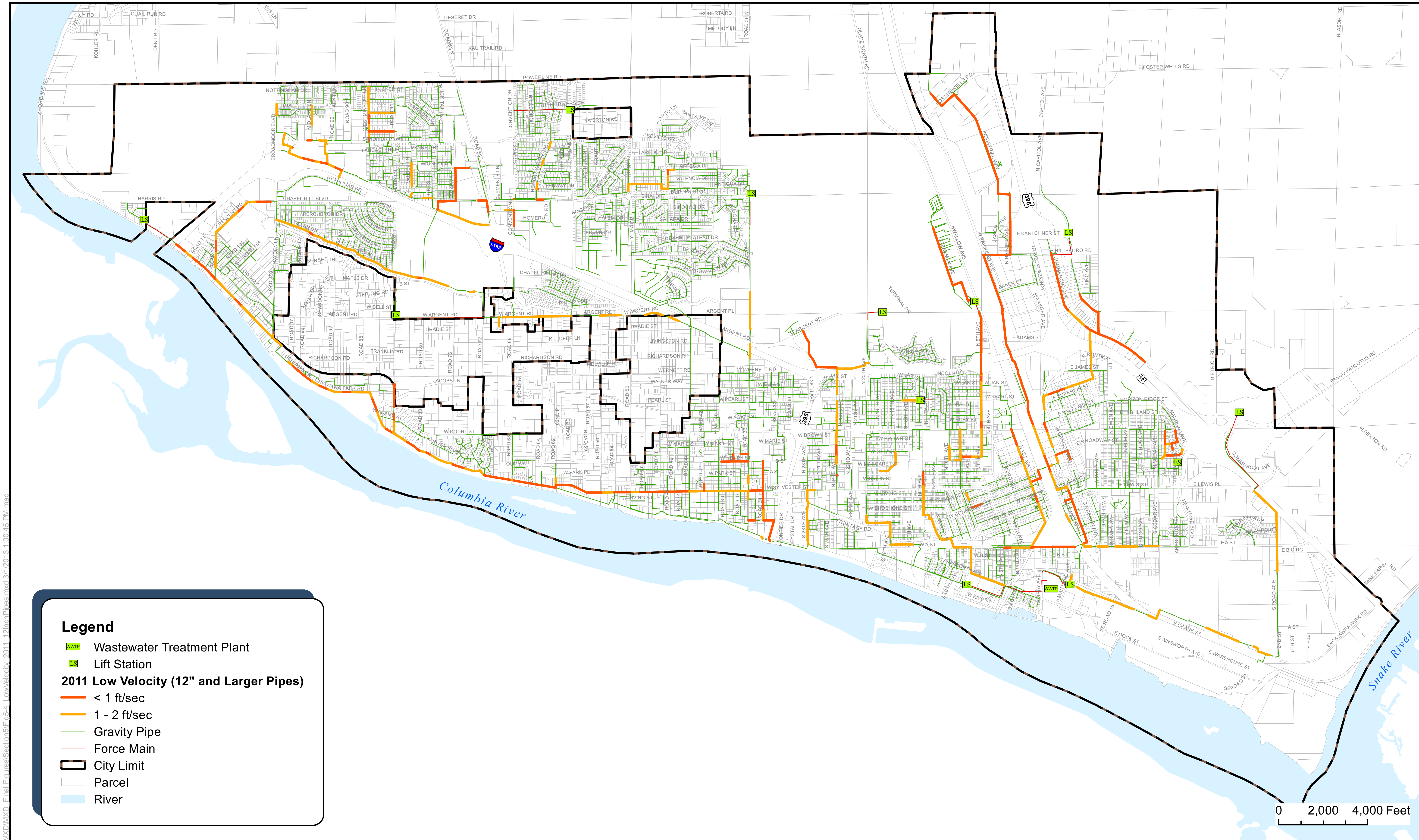
Comprehensive Sewer Plan

Figure 5-2
Historical CCTV



Comprehensive Sewer Plan

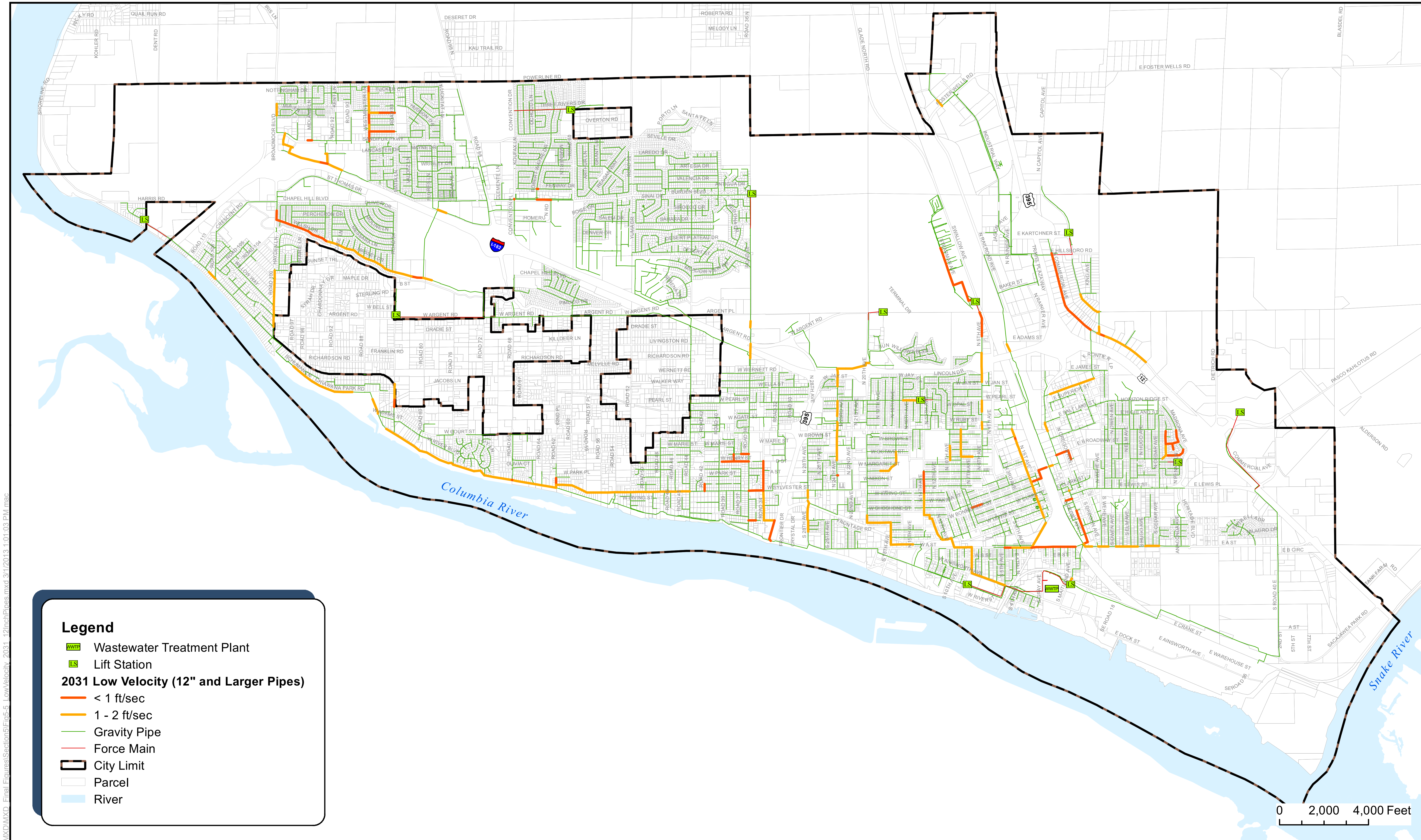
Figure 5-3
CCTV Basins



Comprehensive Sewer Plan

Figure 5-4
Low Velocity - 2011
Pipes 12 Inches and Larger

March 2013 11-1261



Comprehensive Sewer Plan

Figure 5-5
Low Velocity - 2031
Pipes 12 Inches and Larger

March 2013 11-1261

SECTION 6
NEEDS INVENTORY AND ALTERNATIVES ANALYSIS

Introduction

This section inventories the deficiencies based on the sewer collection and treatment systems evaluation, gathers additional input from City of Pasco (City) staff, reviews alternatives where needed and identifies the preferred recommended alternatives for wastewater system upgrades. The evaluation of the City's wastewater system included a capacity analysis of the collection system and treatment facility under existing and future sewer loads in conjunction with current and anticipated future regulatory nutrient removal requirements.

Sections 3 and 4 provided a summary of the wastewater system deficiencies. An initial proposed list of capital improvements was developed and presented to the City. Through a series of workshops this initial capital improvements list was reviewed with the City staff, who provided input on recommended additions based on their working knowledge of the wastewater system. Additionally, an alternatives evaluation for a second wastewater treatment plant (WWTP) was completed to determine a recommended approach to expanding the City treatment capacity.

Collection System

Correction of Collection System Deficiencies

A collection system analysis was performed in Section 3 that included hydraulic modeling to simulate performance of the system with respect to flows and system capacities. After hydraulic capacity simulations were run, system deficiencies were identified. These deficiencies are presented in Section 3, Table 3-10, and are also presented below.

Table 6-1
Summary of Collection Deficiencies

Location	Description of deficiency	Timeframe
Gravity Line Downstream of Pearl Street Lift Station	Dry weather d/D > 1.0 as a result of inadequate gravity collection system capacity	Existing deficiency
Argent Road and Road 44 Interceptor	Dry weather d/D > 1.0 as a result of inadequate gravity collection system capacity	By 2031 or as development dictates
9th and Washington Lift Station	Inadequate Firm Capacity	By 2031 or as development dictates
Maitland Lift Station	Inadequate Firm Capacity	By 2031 or as development dictates

In general, the hydraulic model simulation of current and future flows within the existing collection system revealed relatively few system deficiencies. It appears the majority of the City's collection system has the capacity to accommodate current and future flows within the existing service areas.

After deficiencies were identified, model scenarios were completed to determine options to address the collection system deficiencies. These options were reviewed with City staff through a series of workshops, with staff providing valuable input with respect to operation and maintenance considerations. Results of this analysis and collaborative evaluation of the collection system deficiencies are summarized as follows.

Gravity Line Downstream of Pearl Street Lift Station

The results from all flow scenarios indicated that the downstream gravity sewer that receives discharge from the Pearl Street Lift Station is not able to convey sewer flows without surcharging. The City's input on this deficiency indicates that it is a known issue, but the surcharging has not negatively affected sewer customers in the area. Additionally, the City has indicated that the pumps are old and in need of replacement. Further, the Pearl Street Lift Station serves an area that is completely built out in an older part of the City.

The alternatives analysis looked at several options, from replacing the pumps and force main to upsizing the downstream gravity sewer system. A review of the downstream sewer segment identifies a capacity of 223 gpm, approximately 250 feet further downstream the capacity increases to 245 gpm. The 245 gpm capacity limitation is close to the estimated peak flow condition coming into this lift station. In order to eliminate the surcharging, a preferred alternative is to replace the existing pumps with pumps that more closely match current and future peak flows entering the lift station. This will require an evaluation of the existing force main and the potential need to extend the current discharge location downstream. Maintaining minimum velocities in the force main will need to be considered as well as detention times and the potential of odor generation. The timeframe for this project is within the next five (5) years.

Argent Road and Road 44 Interceptor

The hydraulic modeling identified surcharging within the Road 44 Interceptor under 2031 peak flow scenarios along Road 44. The segment of the interceptor that is surcharging is a smaller diameter sewer than the upstream portion of the interceptor. The reason for the larger upstream segment was to lay the sewer at a flatter grade. While this deficiency could be resolved by upsizing the line in the areas where surcharging is seen, the modeling was able to confirm that the surcharging can be eliminated by adjusting the orientation of the upstream diversion structure at Chapel Hill Boulevard and Broadmoor Boulevard. It is recommended that switching the direction of this diversion should be implemented to convey flow along Crescent Drive and subsequently along the West Pasco Trunk Sewer to the WWTP.

In the future, beyond the 20-year planning period, as the West Pasco Trunk develops capacity limitations, upsizing the Road 44 Interceptor may prove to be a cost effective option to increase overall capacity in this area of the collection system. It is estimated that diversion change will need to occur by 2031 or as development dictates.

9th and Washington Lift Station

At the 9th and Washington Lift Station surcharging was identified immediately upstream under the 2031 peak flow scenarios with the largest pump offline, “firm” capacity criteria requirement. During review of this deficiency, the City indicated the existing pumps experience frequent ragging and would like to replace the antiquated VFDs to improve reliability and flow pacing to the WWTP. The City staff also has other improvements they would like completed at the lift station, which include improved access to dry well, valve replacement and improved access to the roof hatch. Backup power considerations will also need to be evaluated as the 9th and Washington Lift Station is upgraded.

The alternatives analysis looked at several options; from upsizing all the pumps to just replacing the smaller pumps to increase “firm” capacity. It is recommended that improvements to the station be addressed in two (2) phases. Phase 1 will address current deficiencies noted by staff in order to keep the station functional and operable, and Phase 2 will address future capacity deficiencies that were identified in the hydraulic modeling.

As part of the Phase 1 improvements a predesign evaluation of the entire station is recommended to coordinate and prioritize between the two (2) phases of work and ensure all station deficiencies are address. The evaluation would review pump replacement scenarios to maintain adequate station capacity with the immediate need to replace antiquated equipment to ensure station reliability.

Maitland Lift Station

At the Maitland Lift Station surcharging was identified immediately upstream under the 2031 peak flow scenarios with the largest pump offline, “firm” capacity criteria requirement. Upon review of this deficiency, City staff has indicated that under current conditions the current pumps are oversized for existing flows, resulting in surges to the WWTP headworks and long detention times in the wet well.

To address both short term and long term station deficiencies, it is recommended that a fourth, smaller pump be installed at the station. The lift station has a space for a fourth pump, which can be sized to meet current flow conditions for better flow pacing and increase the overall firm capacity of the lift station. A key element of the preliminary design of this station improvement is the sizing of the proposed pump. The timeframe for this project is within the next five (5) years.

Additional Collection System Needs

Capitol Avenue Lift Station

The City currently maintains a temporary lift station to a dry area of the collection system in the northeast part of the City. This area is located east of US 395 and north of US 12. As future development occurs a new lift station will need be installed and connected to the existing force main to convey wastewater to the City's WWTP. This improvement includes a new wet well with two (2) pumps, piping and associated appurtenances to convey an average flow of 165 gpm for the service area within the Urban Growth Area (UGA). Timing is based on when development occurs over the next 20 years.

Additional Flow Monitoring and Data Collection

A number of specific areas in the older downtown area of the City were identified as "approaching" capacity, but were not actually deficient based on the criteria. These areas were discussed with City staff and in many cases the manhole depths were field verified. It is also suspected that the downtown area contains the most opportunities for precipitation induced inflow to enter the system through direct rooftop drain connections and some possible stormwater connections. This area of town also contains the oldest piping in the system, which may be most prone to infiltration.

Recommendations are focused specifically on; 1) continue collection of survey grade manhole invert elevation data, 2) perform focused sewer flow monitoring, and 3) perform lift station flow tests. The City has acknowledged that additional data collection and as-built verification should be completed to assess the overall accuracy of elevation data in some areas due to concerns over the various datum used in the past. Flow monitoring will help the City define areas of potential infiltration and inflow in order to focus their closed circuit television (CCTV) inspection efforts as well as their annual sewer relining program. Updated manhole survey grade invert elevation data will provide updates to the City's GIS layers to continue the development of the model and better management of collection system information.

Collection System Odor and Corrosion Alternatives

As defined in Section 3, the City is experiencing odor and corrosion problems in specific portions of the collection system. The hydrogen sulfide gas generation within the collection system has resulted in odor complaints and corrosion in portions of the collection system. Through on-going CCTV and inspection, the City has identified approximately 34,000 feet of collection system piping that should be evaluated. There are two (2) primary sections of concern. The first is the Road 44 Interceptor Sewer along 44th Street from Dradie Street to Sylvester Street continuing along Sylvester Street to Road 36, then along Road 36 and the Columbia River to US 395. This comprises approximately 13,000 feet of primarily 21-inch to 36-inch diameter pipe. The second section of piping is the West Pasco Trunk Sewer along the Columbia River between I-182 and Road 64, which comprises 21,000 feet of 18-inch to 36-inch diameters. See Figure 3-19 for the location of these areas within the City.

Initial review of these two (2) areas within the collection system indicates that repair and rehabilitation is required for concrete pipe and manholes. Due to the extent of the corrosion it is recommended that the rehabilitation occur soon to keep the concrete pipe and manholes from reaching conditions upon which repairs could not be achieved. The following two (2) locations have been identified as priorities. The recommendation is to rehabilitate the concrete pipe and manholes in these two (2) areas in the near future and continue monitoring of downstream segments for corrosion.

Road 44 Interceptor Sewer Repair

Based on City assessment of the corrosion the following has been developed for the rehabilitation of the existing concrete pipe and manholes along Road 44. This project includes the lining of 21 manholes and CIPP lining of 4,700 feet of 21-inch sewer main extending from FCID Canal to Court Street along Road 44.

West Pasco Trunk Sewer Repair

The City's assessment indicates that there is extensive corrosion of the concrete manholes and the concrete pipe just upstream and downstream of the manholes. The City is currently planning to repair the concrete that has degraded in the manholes and the short segments of pipe as part of their annual sewer relining program. This includes the grout repair of 22 manholes and 660 feet of 30-inch sewer trunk line along the Columbia River. The recommendation is that this area is rehabilitated using CIPP to protect the sewer from further corrosion. This project would include rehabilitation of the existing manholes and sewer trunk line for the upper portion of the River Line sewer from I-182 to Road 64.

Short Term and Long Term Odor and Corrosion Control

To control hydrogen sulfide generation which is causing the odor and corrosion issues in the collection system segments previously identified the following short and long term odor and corrosion control measures have been defined. The City is currently pursuing the piloting of a bioxide injection system on the upper end of the Road 44 Interceptor to address odor and corrosion issues. A number of conditions will impact the rate and concentration at which hydrogen sulfide gas is produced in the collection system, including flow which will change over time, making selection of a single treatment approach challenging. Based on the variability of the hydrogen sulfide generation, a phased approach is recommended to address odor and corrosion issues. A phased approach will implement a system improvement and evaluate its effectiveness through system monitoring to determine if hydrogen sulfide gas is at acceptable levels or if addition improvements (phases) are needed.

This phased approach allows the City to minimize its investment in addressing the odor and corrosion control issues as much as practical. Once the generation of the hydrogen sulfide is treated, it will reduce any further degradation of system piping and manholes. The following phased recommendations have been developed for the Road 44 Interceptor and the West Pasco Trunk.

Road 44 Interceptor

Phased improvements would be to continue with the implementation of the bioxide injection system and follow up monitoring to determine effectiveness. Specific to the Road 44 Interceptor is to improve the confluence at Dradie Street and Road 44. Due to the configuration of sewer piping at this conjunction, turbulence is excessive and as a result hydrogen sulfide is released from the wastewater. The next phase of recommended improvements include modifying the pipeline at the north end of Road 44 at Dradie Street to remove the "T" confluence and reduce the slope of the pipe from the north to reduce turbulence at this location.

An additional alternative was reviewed that would replace the downstream segment along Road 44 to Court St. As discussed previously in the *Argent Road and Road 44 Interceptor* section, there is a capacity limitation in the 20-year planning horizon. This is due to the downstream segment on Road 44 currently being downsized. An option was considered to upsize this segment of pipe, approximately 4,700 feet of 21-inch pipe to 24-inch pipe to improve the downstream hydraulics to reduce the crown pressure conditions that are contributing to the odor issue and increase capacity of the pipe. This option would be a significant capital cost and may not completely address the current odor issues.

If odor continues to exist a vapor phase odor control system would be installed downstream of the confluence. If additional monitoring indicates that odor is still being generated further downstream a second vapor phase odor control system would be installed on the downstream portion of Road 44.

West Pasco Trunk

A phased approach would also be planned for this area. There have been limited odor issues along this segment, but the City has found corrosion of concrete pipe and manholes along this reach. Existing odor/corrosion is believed to be caused by the low flow conditions allowing for the anaerobic process to generate hydrogen sulfide. It is anticipated as development continues in the northwest portion of the City that flows will increase in the West Pasco Trunk improving the conditions and reducing the hydrogen sulfide generation.

The recommendation to address hydrogen sulfide, if it continues to persist, is to locate a bioxide injection system at the West Pasco Water Treatment Plant (WTP). This will provide bioxide at the upper end of the West Pasco Trunk to control the biological reduction of sulfate. If monitoring indicates that odor/corrosion persists a vapor phase odor control system will need to be evaluated. A limitation is the available space to install the facility and equipment since this area is bounded by urban development and a park area along the Columbia River. This would need to be reviewed in further detail during subsequent phases.

Future Service Areas

As described in the Future Wastewater Flow Projection Section (Section 2), a considerable amount of growth is expected by 2031, much of which will occur outside currently sewered areas. There are four (4) primary growth areas that are not currently sewered, which include:

- Riverview Area
- Northwest Area
- East Industrial Area
- Hillsboro Area

Service concepts have been developed for each of these areas based on hydraulic modeling, geographic information, parcel/right-of-way locations and the configuration of the existing system to generate potential alignments. Service concepts focused on extending the City's existing sewer infrastructure with similar infrastructure, utilizing conventional gravity sewer technology. The service concepts developed utilized gravity improvements to the greatest extent practical and where lift stations are required, they have been identified to serve large areas, to minimize pumping.

It should be noted that in large, undeveloped areas it is difficult to predict when or where specific development will first occur. The concepts described herein and shown in Figures 6-1 through 6-4 are considered conceptual and will require refinement once actual development is planned.

Riverview Area

This region, commonly referred to as "the donut hole," is an area of unincorporated Franklin County that is completely surrounded by the City, as shown in Figure 6-1. The Riverview Area comprises of the West Pasco Trunk, Road 84 Interceptor and Road 44 Interceptor Sewer Basins. Property owners in this area are currently served by septic. A proposed collection system service concept has been developed that follows the natural contours of the area and breaks the area into two (2) subbasins. Due to the topography, the majority of the area cannot gravity flow to existing sewers and will require a lift station within each subbasin.

Each of these subbasins would be drained by gravity to their respective "low spots" where two lift stations would then pump the sewage to the West Pasco Trunk Sewer for conveyance to the WWTP. Remaining portions of the Riverview area can be served directly by gravity to the West Pasco Trunk and the Road 44 Interceptor. The pipe has been sized to serve the "build-out" population based on proposed City zoning densities.

Northwest Area

There is a large portion of the existing UGA and an additional area to the north of the UGA that is currently not sewered, as shown in Figure 6-2. The Northwest Area comprises of the North Court St Service Area and Northwest Service Area sewer basins.

Through the hydraulic modeling of the existing collection system it was identified that the majority of the existing system has capacity to accommodate future flows. However, the existing collection system south of Powerline Road, does not have the capacity to expand, beyond its current service area. Hydraulic modeling did identify that the West Pasco Trunk Sewer does have capacity within the planning period to accommodate flow from this Northwest Area.

Based on the capacity of the existing system, a service concept was developed that would include a large trunk sewer, extending from the West Pasco Trunk Sewer, and two (2) regional lift stations, see Figure 6-2. This concept directs flow from the Northwest Service Area, west toward the Columbia River, than south, connecting to the existing West Pasco Trunk Sewer near the West Pasco WTP.

In developing this service concept, the December 2009 Broadmoor Concept Plan was reviewed, which provided direction for future service and alignment of the proposed trunk sewer. This service concept is also compatible with potential long-term planning for a second WWTP, as discussed later in this section. The West Pasco Trunk Sewer has the capacity within the 20-year planning period to accommodate flow from this area. However, as growth continues and flows increase there will be a need to expand the capacity of the West Pasco Trunk or consider the concept of a second WWTP located in West Pasco. Based on current flow projections, the West Pasco Trunk will not experience capacity limitations for 25 to 30 years.

East Industrial Area

A significant amount of growth is projected for the area that lies predominantly outside the existing City limits to the east as shown in Figure 6-3. The East Industrial Area comprises of the NE Commercial Avenue Area, Road 40 East Interceptor, East Service Area and Sacajawea Park Road Interceptor Sewer Basins. The vast majority of this growth will be industrial in nature and some of it will be food processor type waste that will ultimately be conveyed to the City's Reuse Facility. However, a significant portion is projected as manufacturing or "dry industrial" in nature and will be conveyed and treated at the City's WWTP.

In planning for the design and construction of the Commercial/Kahlotus Lift Station, basins in this service area were identified prior to the comprehensive planning process. In the comprehensive planning process service areas were confirmed and include three (3) subbasins, each served by a sewerage lift station. The Commercial/Kahlotus Lift Station has recently been completed and is already conveying flow to the existing gravity system, part of the Road 40 East Interceptor. The south subbasin will require a sewage lift station to convey sewage from the East Service Area to the Sacajawea Park Road Interceptor. The Southeast Pasco Trunk and Maitland Lift Station are both capable of conveying significantly more flow than is currently being conveyed. The Southeast Pasco Trunk and Maitland Lift Station will convey the flows from growth areas in the Road 40 East Interceptor, East Service Area and the Sacajawea Park Road Interceptor. The north subbasin which is the NE Commercial Avenue Area Sewer Basin will convey sewage to PSC5 Sewer Basin.

The Port of Walla Walla is also constructing a pipeline under the Snake River that will also convey their sewage through the South East Pasco Trunk. The localized gravity lines required to serve the future industrial customers will need to be identified once those customers plan to develop.

Hillsboro Area

Hillsboro is the smallest of the four (4) areas and will serve a region north of the airport. A lift station location has been identified just east of Glade North Road that will convey flow through a force main to existing gravity mains at the intersection of Northern Street and Burlington Street. The lift station has been located at the lowest point in the area to allow for gravity collection to serve development in the area. See Figure 6-4 for a schematic of the area.

Wastewater Treatment Systems

This section presents a summary of the wastewater treatment alternatives evaluation that was performed to determine the current and future wastewater treatment improvements. The alternatives were developed and evaluated taking into consideration current and forecasted wastewater flows, the projected system growth, evaluation of the City's collections system and the evaluation of the City's existing municipal WWTP.

Wastewater Treatment Alternative Concept

Based on the evaluation of wastewater treatment needs over the next 20 years and input from City staff, wastewater treatment improvement alternatives have been developed. These alternatives represent two (2) basic concepts for wastewater management for the City, upgrade the existing WWTP or construct a new wastewater treatment facility in West Pasco. The concept of a new wastewater treatment facility was developed prior to this Comprehensive Planning process. Concerns over the capacity of the existing collection system and treatment plant to accommodate flows from anticipated development in West Pasco prompted the discussion of the second WWTP near the site of the City's new WTP.

Due to the topography and layout of the existing collection system, a new facility located near the City's new water treatment facility will be able to capture approximately one (1) million gallons per day (mgd) over the next 20 years. See Figure 6-5 for map of possible second WWTP site. A new treatment facility in West Pasco will not eliminate the need to upgrade the existing WWTP. Capacity and process improvements will be needed over the next 20 years at the existing WWTP to accommodate future flows and treatment requirements even with the new West Pasco facility on line.

The advantages and disadvantages of the concept of constructing a new WWTP in West Pasco have been inventoried base on the evaluation of the existing WWTP and collection system to accommodate current and future flow conditions.

Advantages of constructing a West Pasco WWTP are:

- Offload of flow from the existing plant, potentially reducing the magnitude of the required upgrades to the existing WWTP.
- Offload of flow from portions of the existing collection system, potentially reducing the magnitude of the required future collection system upgrades.
- A potential source of reclaimed water in West Pasco.

Disadvantages of constructing a West Pasco WWTP are:

- The additional capital costs associated with a new WWTP are not offset by cost savings at the existing WWTP or in the collections system.
- Increase operation and maintenance associated with operating two treatment facilities compared to operating one.
- Current odor and corrosion issues within the existing collection system may not be reduced, and could potentially worsen, by diverting flow to a new WWTP, thus reducing flow in the existing collection system.
- Current operational challenges at the existing WWTP associated with diurnal flows and loading may be adversely impacted by diverting flow from the existing WWTP to a new facility that is located on the edge of the collection system.
- Challenges associated with obtaining permits and environmental approvals, including a new National Pollutant Discharge Elimination System (NPDES) permit that may take years to obtain, if at all, and require significant project funding resources.
- Significant public involvement and potential challenges compared to upgrading the existing plant.

WWTP Alternatives

Three (3) treatment alternatives for the City have been developed from the two (2) basic concepts for wastewater management previously discussed. All three (3) alternatives were sized and evaluated to meet current and future flow and regulatory conditions. These three (3) alternatives are:

Alternative 1 – Upgrade the existing WWTP

This alternative utilizes the existing facilities to the greatest extent possible. Upgrades to the existing WWTP will be required to accommodate future flows and regulatory requirements.

Alternative 2 – Upgrade the existing WWTP and construct a water reclamation facility in West Pasco

Alternative 2 represents an alternative that uses the existing facilities and constructs a water reclamation facility in West Pasco. The water reclamation facility will produce reclaimed water for use by the City and discharge all residual solids back into the sewer to be treated at the existing WWTP. This “scalping” plant will not have a river discharge, thus relying solely on the beneficial use of the reclaimed water to operate.

Alternative 3 – Upgrade the existing WWTP and construct a full WWTP in West Pasco

Similar to Alternative 2, Alternative 3 represents an alternative that uses the existing facilities and constructs new facilities in West Pasco. In this alternative, the West Pasco facility is a full, independent treatment plant, with a discharge to the Columbia River. This facility will operate under a separate NPDES permit, but will rely on the existing WWTP for solids processing.

Alternatives Evaluation and Ranking

Evaluation Criteria

Alternatives for capital improvements to accommodate future WWTP capacity and process needs have been developed. Evaluation criteria were developed with City staff to consider all aspects of the proposed alternatives and define the preferred alternative for future wastewater treatment for the City. Evaluation criteria are listed and defined as follows.

1. *Capital Costs* – This component considers the project cost of the alternative including construction cost, contingencies, engineering, and other costs associated with the project.

    a. *Existing WWTP* – Capital costs over the next 20 years to accommodate anticipated wastewater flows and process needs.
    b. *Proposed West Pasco wastewater treatment facility* – Capital costs over the next 20 years to construct a WWTP in west Pasco.
    c. *Total Capital Costs* – a. plus b.

2. *Capital Cost Expenditures* – This criterion considers the need for funding for the proposed wastewater treatment facility capital improvements over the next 20 years. Funding requirements are separated into the following categories:

   a. *One (1) to six (6) years* – Capital costs over the next six (6) years to accommodate anticipated wastewater flows and process needs.
   b. *Seven (7) to 20 years* – Capital costs beyond six (6) years to accommodate anticipated wastewater flows and process needs.

3. *Phasing Potential* – This component considers the potential for the proposed alternative to be implemented in phases to defer project elements and associated costs. In particular, the feasibility of the alternative to accommodate a potential initial phase of improvements to meet current operating demands.

4. *Permitting/Regulatory Considerations* – This component considers the impacts of required permits and approvals, as well as environmental and regulatory reviews on the project scope and schedule.

5. *Operation and Maintenance Resource Impacts* – This component considers the operation and maintenance resource demands associated with each alternative including relative impacts to annual operation and maintenance resources and cost.

6. *Collection System Impacts* – The criterion compares the impacts of each alternative to the existing collection system and how each alternative may affect the collection system and its operation.

7. *Treatment Facility Impacts* – This component considers the impacts of each alternative to the operation of the existing treatment facility.

8. *Water Quality Impacts* – This criterion evaluates the relative impacts to the overall treatment process and water quality associated with each alternative.

9. *Water Reclamation/Reuse Opportunities* – This component considers the opportunities available for water reclamation and reuse associated with each alternative.

10. *Future Regulatory Considerations* – This criterion considers the relative impact of future regulatory requirements on each alternative and how each alternative is able to accommodate the potential treatment standards associated with new regulations.

11. *Public Acceptance* – This component considers the public's relative response to the implementation of each alternative.

Alternatives Ranking

The following table presents the evaluation and scoring of the three alternatives utilizing the previously described criteria. General comments are provided under each alternative for each criteria. The evaluation and scoring of alternatives was derived through meetings with City staff and consultant recommendations.

To score the alternatives each criteria component for each alternative can be given a score of one (1) to five (5), with one (1) being the lowest or least favorable score, and five (5) being the highest, or most favorable score, for each of the alternative analysis criteria presented. Each of the criteria can then be assigned a weighting value, or multiplier, on a scale of one (1) to five (5), with one (1) reflecting the lowest relative importance and five (5) being the highest. The raw scores for each criterion are multiplied by the weighting value and then are totaled. The alternatives can then be ranked based upon the highest to lowest total weighted score as being the most favorable to the least favorable.

Table 6-2
Alternatives Ranking

Criteria	Criteria Weight	Alternative 1 - Upgrade Existing WWTP		Alternative 2 - Upgrade Existing WWTP & Construct a Water Reclamation Facility (Scalping Plant)		Alternative 3 - Upgrade the Existing WWTP & Construct a full Wastewater Treatment Plant	
		Score	Comments	Score	Comments	Score	Comments
1. Capital Costs	5	5		3		2	
a. Existing WWTP			$15,500,000		$15,500,000		$13,400,000
b. West Pasco Treatment Facility			Not Applicable		$12,000,000		$15,500,000
c. Total Capital Costs			$15,500,00		$27,500,000		$28,900,000
2. Capital Cost Expenditures	5	5		3		2	
a. 1 to 6 years			$3,900,000		$10,100,000		$13,500,000
b. 7 to 20 years			$11,600,000		$17,400,000		$15,400,000
3. Phasing Potential	3	5	HIGH - Capital projects can be phased in over time as capacity and treatment needs develop.	3	MEDIUM - The initial phase will require significant capital funding. Once the initial phase is complete, phasing of future improvements can be accommodated.	2	LOW- The initial phase will require significant capital funding. Once the initial phase is complete, phasing of future improvements can be accommodated.
4. Permitting/Regulatory Considerations	4	5	LOW- Minimal permitting is anticipated. Current NPDES permit is in place and the use of the site for a WWTP has been established.	3	MEDIUM - As a reclamation facility, no NPDES permit is required. Land use and other permits and regulatory reviews will be required.	1	HIGH - Requires a NPDES permit. Land use and other permits and regulatory reviews will be required.
5. Operation & Maintenance Resource Impacts	3	5	LOW - O&M resource will need to increase with increase in plant capacity and complexity	3	MEDIUM - Increase O&M associates with operating two facilities. O&M requirement on a scalping plant would be lower compared to a full treatment plant.	2	HIGH - Increase O&M associated with operating two WWTP's. Increased O&M with respect to solids handling and outfall.
6. Collection System Impacts	2	5	LOW - Collection system has capacity to accommodate flows over the next 20 years. Increasing flows in the collection system will help reduce odor and corrosion issues.	3	MEDIUM - Diverting flow to a new facility will reduce flows in the existing collection system which could sustain or increase current odor and corrosion problems.	3	MEDIUM - Diverting flow to a new facility will reduce flows in the existing collection system which could sustain or increase current odor and corrosion problems.
7. Treatment Facility Impacts	3	4	LOW - Treatment facility will continue to operate as is. Increase in plant capacity will be needed to accommodate future flows.	3	MEDIUM - Diverting flow to a new facility may adversely impact treatment performance at existing facility by maintaining or increasing fluctuations in daily flows.	3	MEDIUM - Diverting flow to a new facility may adversely impact treatment performance at existing facility by maintaining or increasing fluctuations in daily flows.
8. Water Quality Impacts	3	3	MEDIUM - Treated water quality will be similar to current effluent water quaility at the existing treatment plant.	4	LOW - It is anticipated that the new facility will be treating water to Class A standards for reuse. A higher level of treatment than the existing plant.	4	LOW - It is anticipated that the new facility will be treating water to Class A standards for reuse. A higher level of treatment than the existing plant.
9. Water Reclamation/Reuse Opportunities	5	2	MEDIUM - Water reclamation/Reuse opportunities exist at the existing treatment facility but will require an additional step in the treatment process, filtration.	5	HIGH - It is anticipated that the new facility will be treating water to Class A standards, suitable for reclamation/reuse opportunities.	5	HIGH - It is anticipated that the new facility will be treating water to Class A standards, suitable for reclamation/reuse opportunities.
10. Future Regulatory Considerations	4	2	MEDIUM - Existing treatment facility will require upgrades to meet future regulations for netruient removal and other treatment standards.	2	MEDIUM - New treatment facility may be more capatible with meeting future regulations than existing . As treatment requirements become more stringent, operating two facilities will become more expensive.	2	MEDIUM - New treatment facility may be more capatible with meeting future regulations than existing . As treatment requirements become more stringent, operating two facilities will become more expensive.
11. Public Acceptance	5	5	HIGH - Expanding existing facility to meet future needs will be compatible with existing site and current use. Site will be improved with elimination of drying beds.	2	MEDIUM - Locating a new treatment facility near residential homes will encounter public resistance and require a significant public involvement program.	1	LOW - Locating a new treatment facility, with solids handling and an outfall, near residential homes will encounter server public resistance and require a significant public involvement program.
Total Scores		46		34		27	
Total Weighted Scores		174		130		101	

Selection of Preferred Alternative

In a meeting with the City's Public Works Director and City Manager on July 25, 2012, the alternatives evaluation and ranking were reviewed and recommendations presented. From the meeting, the City selected Alternative 1, upgrade the existing WWTP, as the preferred alternative.

Existing WWTP Needs Inventory and Projects

With the selection of the upgrade of the existing WWTP as the preferred alternative, the existing and projected improvements of the WWTP were inventoried and evaluated. The analysis of the unit process, hydraulic and redundancy elements of the plant where completed in Section 4. Based on the evaluation of the existing WWTP performance and noted deficiencies identified, the existing treatment system is able to accommodate current flows and regulatory requirements. To meet future flows, loads and regulatory requirements, a number of improvements at the WWTP will be required.

The City currently operates a biological treatment facility utilizing a trickling filter and aeration basins for the treatment of wastewater. Other forms of wastewater treatment do exist that can be effective in the treatment of municipal wastewater and could be applied by the City. However, the City has made a significant investment in the existing treatment plant and the facilities have substantial service life remaining, therefore expanding the existing treatment processes to accommodate future flows, loads and regulatory requirements is the most cost effective approach to wastewater management.

In the evaluation of alternatives for treatment plant improvements, treatment processes that could accommodate the future wastewater flows for the City were considered. Over the course of two (2) wastewater treatment workshops, held with City operations and engineering staff, system deficiencies and alternatives were discussed and preferred projects selected. The first workshop focused on known issues; treatment goals; plant limitations; operation and maintenance challenges and limitations; and anticipated projects at the treatment facility. The second workshop centered on alternatives to address capital needs identified previously. In this workshop setting, preferred alternatives were selected for incorporation into the Capital Improvements Program.

Although the alternatives associated with some of these components may be dependent on each other, for simplicity they will be considered separately. The following is an overview of the improvements that were selected by the City.

Headworks Improvement - Grit Removal

The basic objective of the grit removal system in the headworks is to provide for the reliable removal of grit, sand, cinder and other heavy solid material from the liquid treatment train of the WWTP. The existing grit removal system capacity is less than the future flows. To service the future flows and provide effective grit removal, another grit removal unit and appurtenances will need to be added.

Primary Treatment Expansion/Improvement - Primary Clarifier

As flow to the WWTP increases, the existing rectangular primary clarifiers will be overwhelmed and undersized to the point that that they will only remove a small portion of the incoming total suspended solids and biochemical oxygen demand (BOD). This ineffective removal will adversely impact the capacity and operation of downstream systems. To overcome this, the primary clarification system will need to be expanded.

Historically, primary clarifiers have been round or rectangular. The City's existing clarifiers are rectangular. Due to the size of proposed clarifiers, the layout of the existing WWTP and wanting to keep similar process in close proximity, rectangular clarifiers, similar to the existing, are anticipated. The proposed clarifier expansion could be performed in two phases to accommodate flow increases over time. The initial project should include a new primary sludge pumping station which will include a new pump house, pumps, controls, electrical, mechanical piping, and site piping. The new pump station will be situated near the existing and proposed clarifiers.

Process Building Modification

The drivers for modification and expansion of the process building are threefold: (1) the removal of the primary sludge pumps and controls and compliance with applicable standards, (2) separation between the digester room and occupied space must be provided to comply with NFPA 820, and (3) staffing expansion due to increase flow and process capacity and complexity.

The existing primary sludge pumps are housed on the basement of the administration building. These pumps are a noise nuisance to staff: particularly in the breakroom. These pumps have also occasionally broken down and primary sludge has spilled in the pump room. Recently, in January 2012, the sludge backed up into the breakroom creating a health hazard and destroying the flooring and portions of the drywall.

National Fire Protection Association is a trade association that creates standards and codes for usage by local governments. This includes building codes that are applicable to the WWTP. NFPA 820 requires separation between the digester room and occupied space that is the administration building. The separation can be created by a breezeway, removing one (1) door and an office. The loss of space will be offset by the creation of more offices in the old primary sludge pumping room. These will include modifications to the HVAC, lighting and other building support systems.

As City growth continues, the WWTP plant flow will increase, resulting in the expansion of the WWTP. This expansion will result in increased operating equipment as well as a complex operational strategy. Based on this expansion, the number of WWTP staff must also increase. To handle the new staff, the administration building must expand to house the staff. The expansion will include larger locker rooms and more offices.

Secondary Treatment - Nitrification

Ecology estimates that by 2020, the City will have effluent ammonia limits. Assuming the existing trickling filter is maintained, the existing aeration basin volume will need to be expanded to treat BOD and remove ammonia via full nitrification (10-day SRT) by this time. It is anticipated that the addition of this process will most likely require the replacement of the existing aeration basins with new aeration basins with multiple treatment trains and an up-front anoxic selector cell or "swing" zone (anoxic or aerobic). The existing aeration basins were built with the concept of having additional aeration basins constructed to the east and west. However, this design is not ideal for nitrification and aeration efficiency due to the low aspect ratio (Length: Width = 2:1) and low sidewater depth (16 feet). A new and/or modified aeration blower building will also be required to support the new aeration basins.

An alternate concept would involve the addition of at least one (1) more trickling filter as a substitute for a portion of the aeration basin expansion. While the existing trickling filter has been low maintenance and reliable for the WWTP, with phosphorus limits anticipated in the next 20 years, the addition of aeration basin volume instead of adding a trickling filter is preferred. The trickling filter will remove the readily biodegradable BOD that drives biological phosphorus removal. Also, as the WWTP expands to fill in the existing site, space will be at a premium and trickling filters will take up this space.

Secondary Treatment - Phosphorus Removal

Based on conversations with Ecology, it is assumed that by year 2031, phosphorus removal without filtration (TP < 1.0 mg/l) could be required. To accommodate the need to reduce phosphorous at this date, the modifications of the City's secondary treatment system to facilitate biological phosphorous removal will be implemented. The proposed project adds selector basins for biological phosphorus removal and expands the aeration basins with all necessary process equipment such as mixers and probes. The trickling filter, intermediate clarifier, trickling filter recirculation pump station and intermediate clarifier sludge pump station will be demolished.

Secondary Clarification Expansion/Improvement

The addition of two (2) new secondary clarifiers is needed by year 2033 in order to address both the state's reliability and redundancy requirements and the increased solids load coming from the aeration basins late in the planning period. The two (2) proposed secondary clarifiers can be expanded to the south of the existing clarifiers where a sludge drying bed currently sits. Along with the additional clarification will be the need to expand return activated sludge and waste activated sludge (WAS) pumping.

Waste Activated Thickening - Dissolved Air Floatation Thickener (DAFT)

The existing DAFT has no redundancy and, during maintenance or repairs, WAS wasting must be stopped or unthickened WAS must be pumped directly to the anaerobic digesters. With the projected increase in flows, this limited reliability needs to be addressed in order to protect the capacity of the digesters. The addition of one new DAFT unit is recommended, as this unit is more cost effective than increasing digestion capacity and will allow operations to keep WAS wasting more consistent, which aids plant operations. A second DAFT can be provided to meet this need. During the 1996 WWTP Improvements, piping for a second DAFT was installed. The project consists of a second DAFT similar to the existing unit and connected all necessary pipes, drivers, pumps and process connections.

Anaerobic Digestion - 3rd Digester

In order to meet the CFR 503 requirements for Class B biosolids (15-day detention) when one (1) digester is off-line for cleaning or maintenance, a third digester and associated control building expansion and/or modifications are identified before the end of the planning period.

Alternatively, the City could use the increased capacity of the sludge drying beds due to the Biosolids Dewatering project (described below) to meet the CFR 503 requirements when one (1) digester is taken off-line. However, since this practice is not routinely done and is would likely not be as dependable, the addition of a third digester was assumed.

Biosolids Dewatering - Screw Press Dewatering

The addition of the rotary drum thickener prior to the drying beds in 2008 significantly improved the capacity of the existing sludge drying beds. However, to reliably meet their future sludge dewatering needs regardless of climatic conditions or loss of sludge drying beds area due to plant expansion and growth, the City selected the addition of biosolids dewatering improvements to further augment their solids handling program.

The addition of a screw press has been considered in the past and the solids handling building and current equipment, a polymer feed system and rotary drum thickener, was constructed to accommodate the installation of future equipment to allow for additional dewatering. This project will not only increase the capacity of the sludge drying beds, but also provide the City with a means to potentially delay the addition of a third digester.

River Outfall Upgrade

While the City's discharge piping provides approximately 40 feet of drop from the effluent flume to the river outfall diffuser, hydraulic analysis shows that the high headlosses in the diffuser and the 24-inch outfall piping submerge the effluent flume at a peak hour flow of approximately 12.3 mgd. To address this deficiency, two phases of river outfall improvements are proposed, the first reduces headloss in the outfall piping and the second phase addresses the limitations associated with the current diffuser.

Water Reclamation

The Reclaimed Water Act encourages using reclaimed water for land applications and industrial and commercial uses and treating wastewater as a potential resource. Chapter 90.48 Section 90.48.112 requires consideration of opportunities for the use of reclaimed water in comprehensive planning process.

Existing Reuse Facility

The City currently operates a Reuse Facility that is separate from the City's domestic wastewater collection and treatment facilities. The reuse facility collects, treats, stores and land applies food processor wastewater from the large processors north of the City. The facility land applies reclaimed water at agronomic rates using a center-pivot irrigation system. A brief description of the Reuse Facility is presented in Section 1.

Water Reclamation Opportunities

Within every community wastewater reclamation opportunities exist. The drivers for water reclamation are usually a combination of economical, social and environmental factors. Although there may be some industries that could benefit from water reclamation in the City, opportunities for water reclamation appear to focus on irrigation.

The City owns and operates a fairly large irrigation network, separate from the domestic water system. The City has established the goal of optimizing the use of its irrigation system to reduce the use of its domestic water system and associated water rights. To that end, the City has developed dual piping systems in portions of its service area, promoted the use of the irrigation system in new development and adopted ordinances to support this goal.

Reclaimed water may be a viable water resource to consider for the City's irrigation system. With the addition of coagulation and filtration at the treatment plant, the City's WWTP effluent could meet Class A standards. This classification is the highest standard that can be achieved and will meet most drinking water requirements, but is not for human consumption, although it can be used with very limited restrictions.

Water Reclamation Demonstration Project

One of the biggest challenges with water reclamation is public perception and acceptance. This requires consideration of an approach to promote the beneficial uses of reclaimed water while dissipating the concerns. In working with City staff to identify potential opportunities for water reclamation and reuse, a concept was developed to utilize reclaimed water around the existing WWTP plant site and adjacent sites that are planned to be developed.

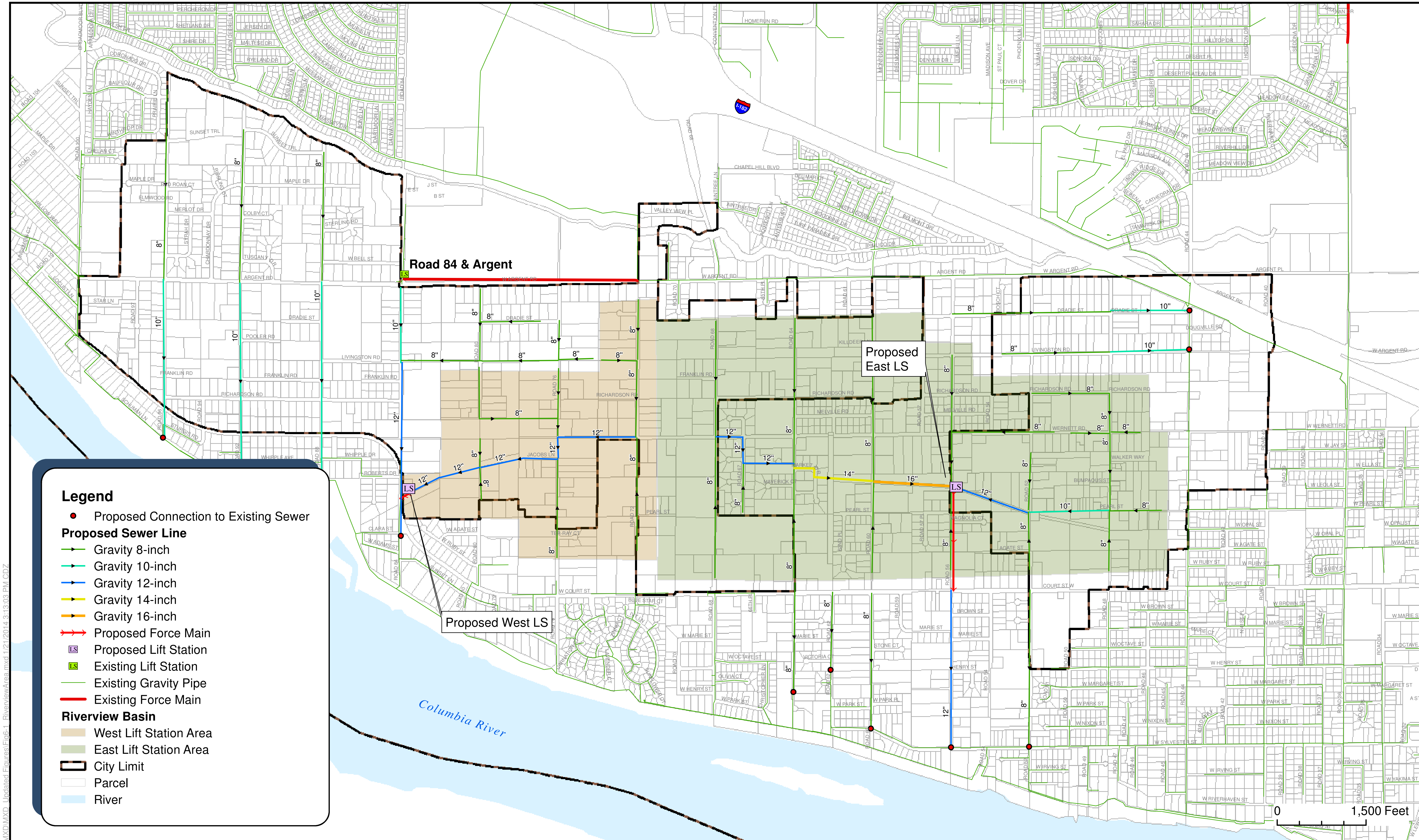
The Port of Pasco's Bid Pasco Industrial Center (BPIC) is located directly east of the WWTP. The BPIC Master Plan, December 1999, identified a subarea adjacent to the WWTP as an "Attraction Area", an area of flexible space with office, light manufacturing and warehouse potential with open spaces and access to the waterfront trail. The first phase of this development has already been implemented with the Port's office building off the corner of Ainsworth Street and Oregon Avenue. With the open spaces and landscaping, this area, as well as the WWTP frontage, has a need for irrigation and the opportunity to utilize reclaimed water.

This project would take a small portion of the effluent, approximately 150 gpm, and provide coagulation, filtration and disinfection to achieve a Class A reclaimed water source. Reclaimed water will be used for irrigation purposes on City and potentially Port of Pasco property in the vicinity of the treatment plant. This area could be further developed to include an interpretative center at the treatment plant site to demonstrate the versatility of reclaimed water. This feature could include landscaping, ponds, constructed migratory bird habitat and trails, as well as access to the trails along the river.

Finding a teaming partner, such as the Port, also provides support and demonstrates acceptance of the concept of reclaimed water. Other teaming partners such as the local schools, Columbia Basin College or university extension services may also have interest in this type of demonstration project.

Water Rights Impacts

Prior to implementing any water reclamation project, the City will need to clearly understand the impacts of reclaiming wastewater and reducing their discharge to the Columbia River on their water rights. The pursuit of a demonstration project will open this dialog and allow the City to understand the implications of water reclamation and courses of action to resolve any conflicts.



MSA Murray, Smith & Associates, Inc.

CITY OF PASCO

Comprehensive Sewer Plan

Figure 6-1
Riverview Area-Service Concept

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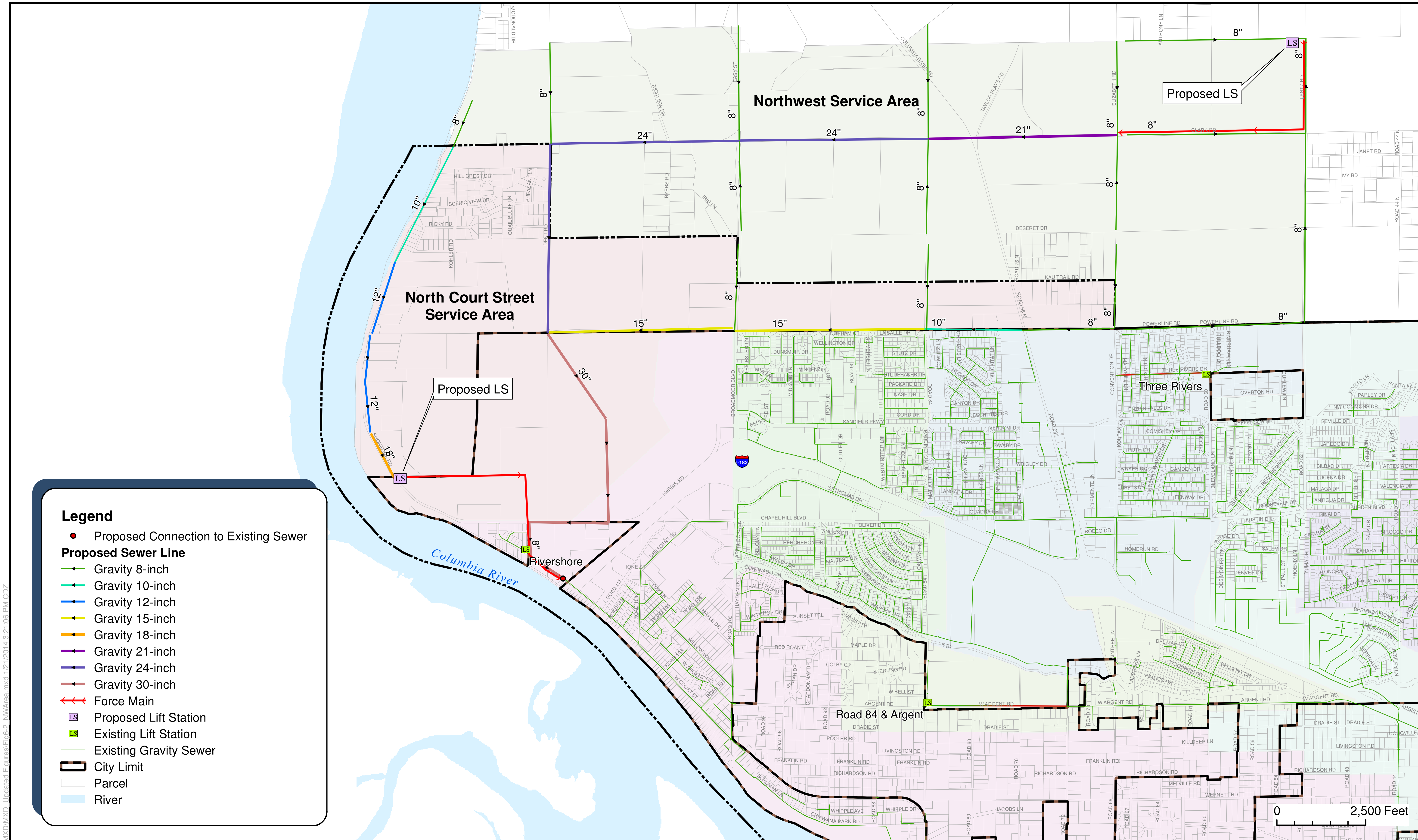

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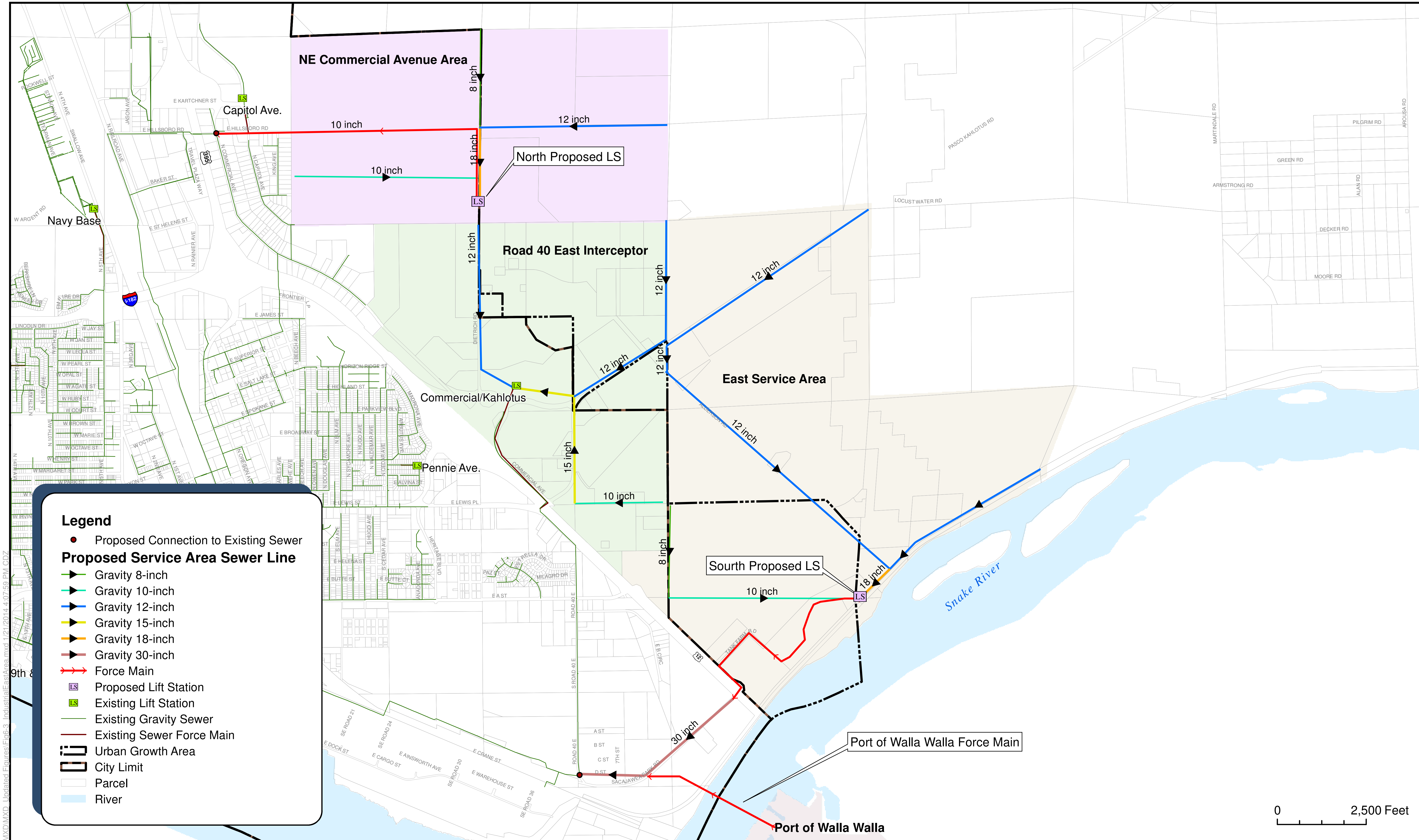
Comprehensive Sewer Plan

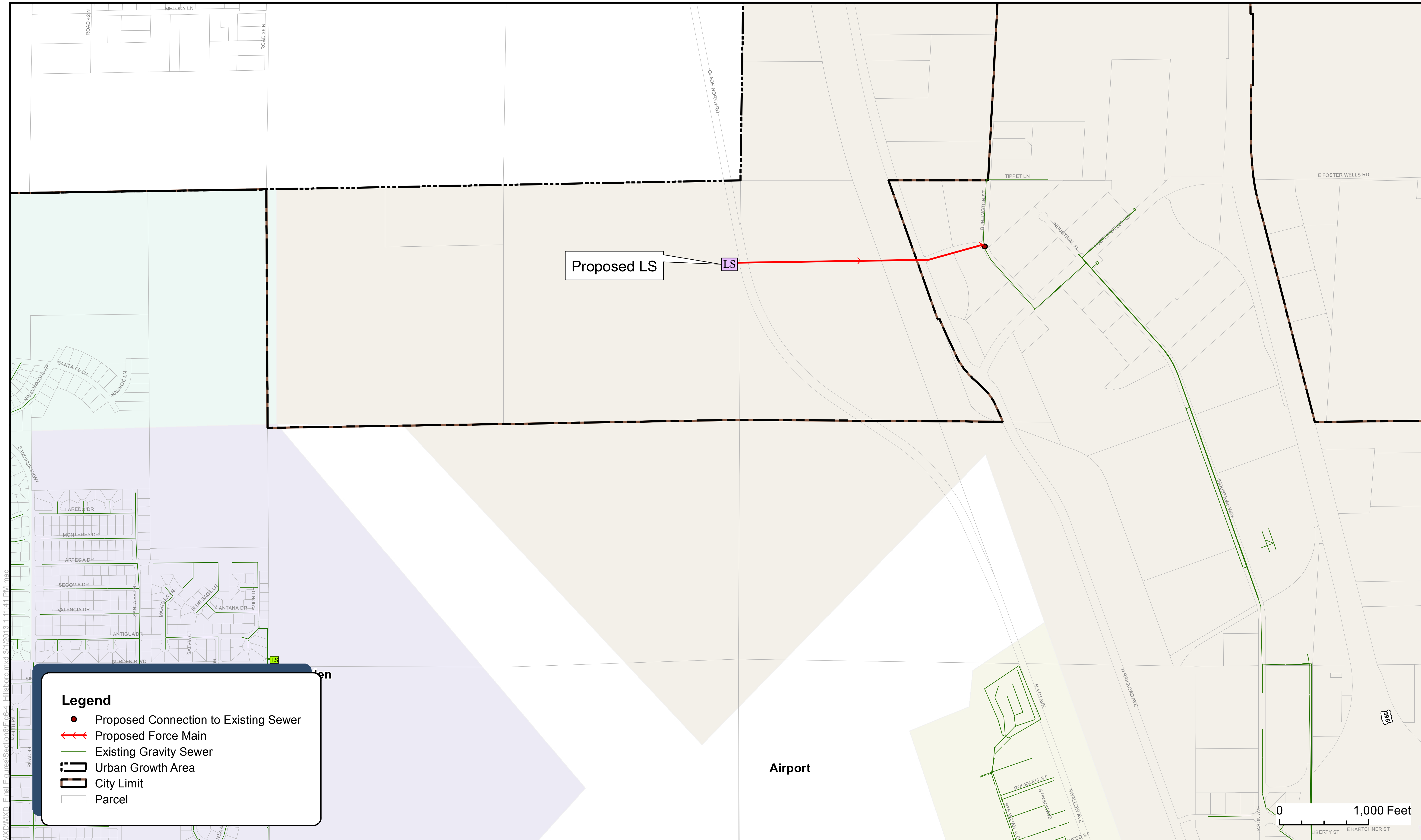
Figure 6-2
Northwest Area-Service Concept

January 2014 11-1261



Comprehensive Sewer Plan

Figure 6-3
East Industrial Area-Service Concept



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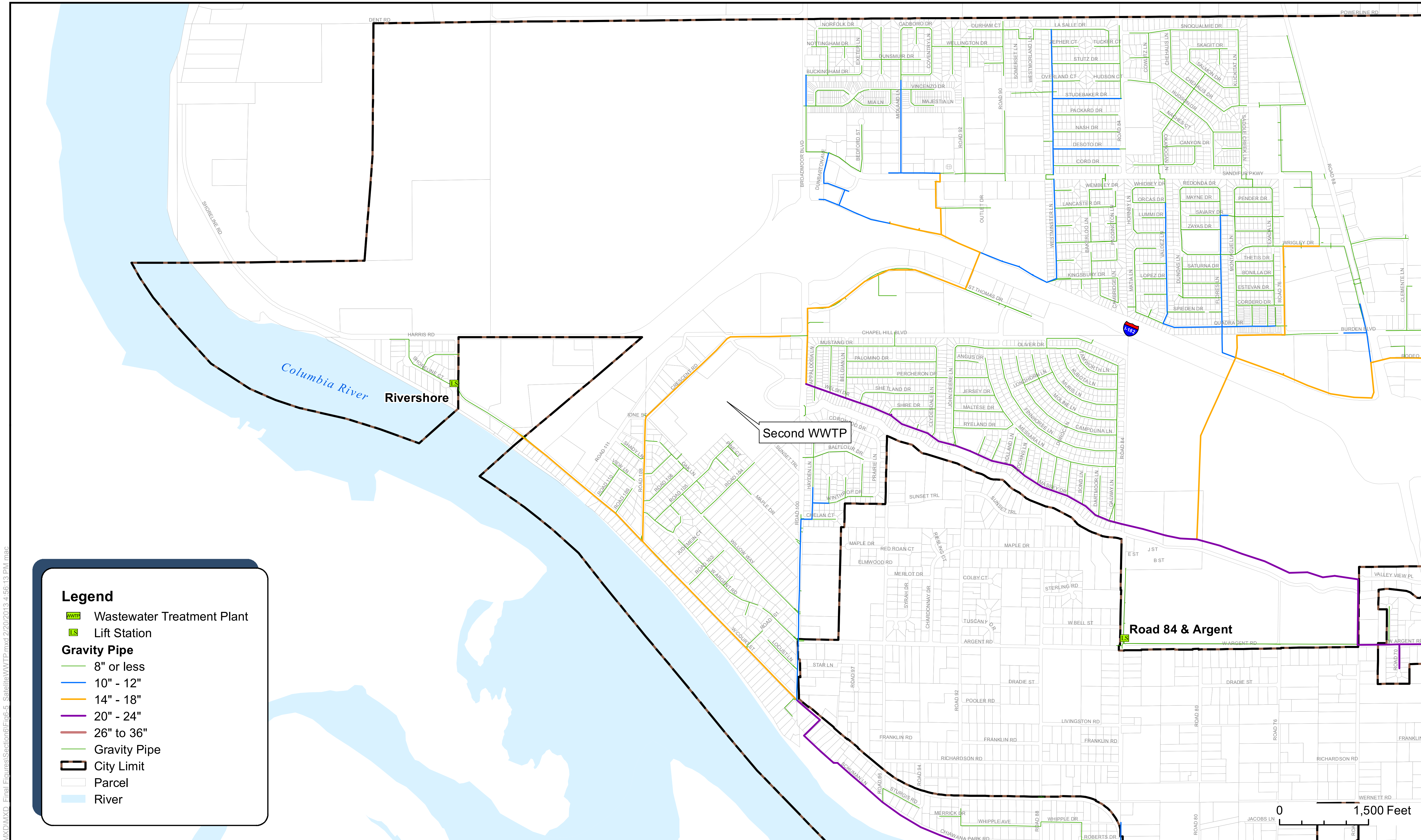
Comprehensive Sewer Plan

Figure 6-4
Hillsboro Area-Service Concept

January 2013 11-1261



Comprehensive Sewer Plan

Figure 6-5
Satellite WWTP Concept

SECTION 7
CAPITAL IMPROVEMENT PROGRAM

Introduction

Previous sections have outlined an overview of the existing system, projections of future growth, wastewater production and an analysis of existing and future wastewater collection and treatment system requirements. This section summarizes the previously identified system improvement needs.

All project descriptions and cost estimates in this Comprehensive Sewer Plan represent planning level accuracy and opinions of costs. The majority of projects identified herein will require more detailed analysis with a project specific engineering report or preliminary design phase. During this study/preliminary design phase of each improvement project will be further defined with respect to scope, specific information and cost. The final cost of individual projects will depend on actual labor and material costs, site conditions, competitive market conditions, regulatory requirements, project schedule and other factors. Because of these factors, project feasibility and risks must be carefully reviewed prior to making specific financial decisions or establishing project budgets to help ensure proper project evaluation and adequate funding.

Basis of Opinions of Probable Costs

The probable costs for each improvement are based on average costs estimated by the 2012 RSMeans Heavy Construction Cost Data, recent City of Pasco (City) project bid tabs, City input, and local contractor and supplier costs. All costs were developed in 2013 dollars based on an ENR Construction Cost Index of 9437.

The project costs presented in this Comprehensive Sewer Plan include estimated construction costs and allowance for contingencies, permitting, legal, administration and engineering fees. Construction costs are based on the preliminary concepts and layouts of the system components developed during the system analysis. The cost basis for each type of project is summarized in the following sections.

Construction Cost

The construction cost is the sum of materials, labor, equipment, mobilization, contractor's overhead and profit, tax, and contingency for each project. At the planning level of an engineering project, a contingency should be applied to cover the cost of uncertainties in the estimate. These uncertainties include unknown details of the project not covered in the unit costs, changes in site conditions and variability in the bidding climate. A state and local sales tax was also included as part of the construction cost.

Traffic control will be required for all projects that occur in a roadway. The cost and level of effort for traffic control should be evaluated for each project as scope and size of project, and as local conditions at the time of construction dictate. For planning purposes, the cost of traffic control is estimated at 0.5 percent of the construction costs.

Erosion control will be required for all projects. Due to variances in between projects, the costs of erosion control should be assessed for each project. For planning purposes, the cost of erosion control is estimated at one (1) percent of the construction costs.

Project Cost

The project cost is the sum of construction cost with additional cost allowances for engineering, legal and administration fees. Table 7-1, shown below, presents the cost allowances for each additional project cost.

The engineering costs include design, surveying and construction management for the project. The administration and legal costs are those associated with the City providing financial and legal oversight of the contract.

Table 7-1
Summary of Additional Costs

Additional Cost Factor	Percent
Traffic Control	0.5%
Erosion Control	1%
Contractor Overhead and Profit	15%
Mobilization	10%
Sales Tax	8.6%
Contingency	30%
Engineering	20%
Legal and Administrative	10%

Pipe Costs

The pipe material for gravity sewer was assumed to be PVC SDR 35 3034 (for 15-inch diameter pipe and smaller) and PVC F-679 (for pipe with a diameter greater than 15 inches). The pipe material assumed for new pressure sewer force main lines was C900 PVC for 4-inch to 12-inch diameter and C905 PVC for 14-inch to 24-inch diameter. For cost estimating purposes it was assumed that all pressure sewer pipes would be PVC.

For all pipe installations, the cost is assumed to include excavation, waste of the material associated with the trenching (which includes haul, load and dump fees), bedding and zone material, native backfill (which includes minimal haul and compaction of material), trench box for trenches deeper than eight (8) feet, testing fittings/closed circuit television (CCTV), and bypass pumping.

As the depth of excavation and trench width increases for deeper and larger pipes, the costs also increase. Therefore, a specific cost has been identified for each pipe diameter and each pipe depth for gravity pipe. Trenches are assumed to utilize a one (1) to one (1) (horizontal to vertical) cutback slope for trench safety beginning at four (4) feet of depth. Eight (8) foot trench boxes are assumed to be used beginning at eight (8) feet of excavation and excavation deeper than this will require a one (1) to one (1) cutback slope increasing the amount of excavation and backfill. For this reason, the cost decreases from seven (7) to eight (8) feet of depth as the excavation volume actually decreases and cost decreases. See Table 7-2 for linear feet (LF) costs. Force mains were assumed to be at a cover depth of four (4) feet and a specific cost has been identified by diameter. See Table 7-3 for force main LF costs. All costs are for replacement of existing pipe.

Table 7-2
Gravity Sewer Costs

Cost per Linear Foot									
Pipe Invert Depth (feet)	**Diameter (inches)**								
	8	**10**	**12**	**15**	**18**	**21**	**24**	**27**	**30**
4	$24	$31	$35	$41	$47	$58	$69	$86	$105
5	$25	$33	$37	$43	$49	$60	$71	$88	$107
6	$33	$41	$45	$51	$57	$68	$79	$97	$116
7	$36	$44	$48	$55	$61	$72	$83	$101	$120
8	$32	$40	$44	$51	$57	$68	$79	$97	$116
9	$34	$42	$46	$53	$59	$70	$81	$99	$119
10	$36	$44	$48	$55	$61	$73	$84	$102	$122
11	$39	$47	$52	$59	$65	$76	$88	$106	$126
12	$43	$52	$56	$63	$69	$81	$93	$111	$131
13	$48	$57	$61	$68	$75	$86	$98	$116	$136
14	$54	$62	$67	$74	$81	$93	$105	$123	$143

15	$61	$69	$74	$81	$88	$100	$112	$130	$150
16	$68	$77	$81	$89	$96	$108	$120	$138	$159
17	$76	$85	$90	$97	$104	$116	$129	$147	$168
18	$86	$94	$99	$107	$114	$126	$138	$157	$178
19	$96	$104	$109	$117	$124	$136	$149	$168	$188
20	$106	$115	$120	$128	$135	$148	$160	$179	$200
21	$118	$127	$132	$140	$147	$160	$173	$192	$213
22	$131	$140	$145	$153	$160	$173	$186	$205	$226
23	$144	$153	$158	$166	$174	$187	$200	$219	$240
24	$158	$167	$172	$181	$188	$201	$215	$234	$255
25	$173	$182	$188	$196	$204	$217	$230	$249	$271

Table 7-3
Force Main Sewer Costs

Diameter	Cost per Linear Foot
4-inch	$40
6-inch	$45
8-inch	$42
10-inch	$65
12-inch	$70
14-inch	$77
16-inch	$89
18-inch	$113
24-inch	$148

Manholes

For new pipeline alignments, manholes are assumed to be located at a maximum spacing of 400 feet for diameters 15 inches or less, 500 feet for diameters 18 to 24 inches, and 600 feet for 27 inches and larger. Existing manhole locations are used when upsizing pipes along existing pipeline alignments. Pipe diameters 24 inches and smaller utilize 48-inch manholes, while pipelines larger than 24 inches in diameter use 60-inch manholes. New manhole costs include the cost for the base, frame, standard cover, installation and testing. No manhole related surface restoration costs were included since it will be addressed separately in the surface restoration cost by lineal foot. The cost for manholes varies depending on the depth and diameter. See Table 7-4 for manhole construction cost.

Table 7-4
Manhole Construction and Repair Costs

Cost per Manhole		
Invert Depth (feet)	**Diameter (inches)**	
	48	**60**
4	$2,429	$3,665
5	$2,866	$4,187
6	$3,343	$4,768
7	$3,863	$5,407
8	$4,424	$6,105
9	$5,027	$6,862
10	$5,672	$7,677
11	$6,359	$8,551
12	$7,087	$9,484
13	$7,857	$10,476
14	$8,669	$11,526
15	$9,522	$12,635
16	$10,418	$13,802
17	$11,355	$15,029
18	$12,333	$16,314
19	$13,354	$17,658
20	$14,416	$19,060
21	$15,520	$20,521
22	$16,666	$22,041
23	$17,853	$23,620
24	$19,082	$25,257
25	$20,353	$26,953

Surface Restoration

All projects are required to restore the surface where the construction occurred back to pre-existing conditions to complete the project. As with the pipe installation costs, the surface restoration costs will increase with the size of pipe and depth of construction, due to the larger trench that will need to be excavated. Therefore, a unit surface restoration cost has been used for each pipe diameter at pipe invert depths of 5-foot increments. Trench boxes are assumed to have a maximum height of eight (8) feet and any excavation deeper than this will require a one (1) to one (1) (horizontal to vertical) cutback slope increasing the surface restoration area. See Table 7-5 for LF costs for surface restoration.

Table 7-5
Surface Restoration

Cost per Unit Length						
Scenario	**Diameter (inches)**	**Pipe Invert Depth (feet)**				
		5	**10**	**15**	**20**	**25**
Road repair and replacement along trench: 4-inch asphalt, 2 inches of 5/8-inch minus crushed rock and 8 inches of 2-inch minus crushed rock base	8	$35	$45	$93	$142	$190
	10	$36	$46	$94	$143	$191
	12	$37	$47	$95	$143	$192
	15	$38	$48	$96	$145	$193
	18	$39	$49	$97	$146	$194
	21	$40	$50	$99	$147	$195
	24	$42	$52	$100	$148	$196
	27	$43	$53	$101	$149	$198
	30	$44	$54	$102	$151	$199
	36	$47	$56	$105	$153	$201
	42	$49	$59	$107	$155	$204
	48	$52	$61	$109	$158	$206

Collection System Capital Improvement Projects

The following projects have been developed based on the alternatives analysis in Section 6. Figure 7-1 presents the locations of these Collection System Capital Improvements and Table 7-6 provides a cost summary for the projects. More details cost estimates are provided in the Appendix C.

Pearl Street Lift Station Improvements

The Pearl Street Lift Station Upgrades is to address the limitation of the downstream gravity system which experience full pipe (surging) conditions under existing and future flow scenarios. This capital project includes a preliminary design phase to further evaluate flows and size pumps, downsizing the existing pumps to better match the lift station influent and the downstream capacity, electrical upgrades and miscellaneous piping adjustments. For planning purposes, this project also includes 800 feet of 4-inch force main that will need to be confirmed in the preliminary design phase.

Maitland Lift Station Improvements

The project includes a preliminary design evaluation to size a new pump to meet current needs, as well as the need to meet future flow conditions at the station. Improvements to the station will include installing a smaller pump to handle low flow conditions, electrical upgrades, and the necessary piping improvements to connect the new pump.

9th and Washington Lift Station Improvements – Phase 1

Near term capital improvements to this lift stations include a preliminary design phase to further refine improvements to ensure near term improvements are compatible with long term needs at the station. For planning purposes, near to improvements include two (2) new smaller pumps designed for solids and rag handling, two (2) new VFDs, piping adjustments (valves, connection to discharge, etc.), electrical upgrades, improved drywell access to eliminate the service elevator and improved roof access.

9th and Washington Lift Station Improvements – Phase 2

This improvement is dependent upon the new pumps selected for the 9th and Washington Lift Station Upgrade Near Term project. If the near term pumps selected are large enough, the lift station will have enough capacity to handle the future flows. If this improvement is needed, it will include lift station evaluation, two (2) new pumps designed for future flow condition (future wet weather flow), two (2) new VFDs, piping adjustments (valves, connection to discharge, etc.) and electrical upgrades.

Capitol Avenue Lift Station

Currently a temporary lift station to a dry area of the collection system. Based on future development requirements, a new packaged lift station will be installed with associated force main improvements to connect into the existing force main. The time of this improvement is based on when development occurs over the next 20 years.

Additional Flow Monitoring and Data Collection

This project consists of completing flow monitoring to gather additional information in the collection system under wet weather conditions in the downtown area. As defined in Section 6, this also includes performing lift station pump tests and obtaining manhole survey grade invert elevation information. Efforts include setup of flow monitoring equipment during the wet weather months to focus on identifying the wet weather response (infiltration and inflow) in the downtown area. Additionally, the difference in the influent and effluent WWTP flow meters will be evaluated. The final product of this project will be a summary of findings, identifying direct connections of the stormwater facilities and associated areas of potential infiltration and inflow. The model and GIS layers will be updated with new elevation information and lift station flow information. Improvements to address the flow measurement discrepancy will be determined as well.

Road 44 Interceptor Sewer Repair

The project includes the rehabilitation of the existing manholes and sewer main along Road 44 that have been impacted by hydrogen sulfide gas. This includes the lining of 21 manholes and CIPP lining 4,700 feet of 21-inch sewer main extending from FCID Canal to Court Street along Road 44. This project will not be completed through an individual CIP, but is planned to be completed as part of the City's Annual Collection System Rehabilitation Program, which is defined below.

West Pasco Trunk Sewer Repair

This project is rehabilitation of the existing manholes and sewer trunk line for the upper portion of the West Pasco Trunk Sewer from Road 88 to Lavender Court that have been impacted by hydrogen sulfide gas. This project includes the lining of 22 manholes and CIPP lining 6,550 feet of 30-inch sewer main extending from Road 88 to Lavender Court along the River Line and required sewer bypass pumping.

Road 44 Corrosion and Odor Control (Phase 1, 2, 3)

To address hydrogen sulfide gas buildup and corrosion along the upper portion of Road 44 the following phased approached has been developed. Initial steps are to complete further evaluation on Road 44 to monitor hydrogen sulfide gas (H_2S) and collection system pressures at multiple locations to determine the effectiveness of the bioxide system that the City has installed.

The next recommended phase of improvements is to improve the confluence at the north end of Road 44 to reduce the turbulence at this location by realigning 90 feet of sewer, replacing two (2) manholes and abandoning one (1) of the existing pipe segments. This phase assumes an easement does not need to be obtained.

An additional phase, if needed after additional monitoring indicates further improvements are necessary, consists of a vapor phase odor control system just downstream of the bifurcation. The assumptions for this vapor phase control system are a 1,000 cfm biological unit with air fan, small water supply, weatherized, vented to appropriate safe location and a 12-foot by 12-foot footprint. If additional odor control is necessary, a vapor phase odor control system at the downstream odor area may be considered. The vapor phase control system would be a 500 - 1,000 cfm biological unit with air fan, small water supply, weatherized, vented to appropriate safe location and a 10-foot by 12-foot footprint is assumed.

West Pasco Trunk Corrosion and Odor Control (Phases 1,2)

The West Pasco Trunk odor control project consists of a bioxide dosing system, which would be located at the City's West Pasco Water Treatment Plant (WTP). This would dose into the West Pasco Trunk which is located in Court Street in front of the WTP. It was assumed that this system would provide treatment based on a flow rate of one (1) to 1.5 mgd with 1 mg/L of H_2S. The estimated dosage would be 12 to 18 gallons per day. Before this project is implemented an engineering analysis needs to be completed along with a validation of flow and hydrogen sulfide concentrations to determine final system sizing.

The second phase is planned, if after additional monitoring indicates that H_2S still needs to be addressed further. Further analysis will need to be completed at that time further improvements that are necessary. For budgeting purposes an assumed improvement consisting of a vapor phase odor control system located downstream of Road 88. The location is anticipated to be within the Chiawna Park area, but further evaluation is needed to determine the appropriate location to address H_2S. The assumptions for the vapor phase control are a 1,000 cfm biological unit with air fan, small water supply, weatherized, vented to appropriate safe location and a 12-foot by 12-foot footprint.

Annual City Sewer Collection System Programs

The City budgets for three (3) specific programs annually to address repair, rehabilitation and expansion of the sewer collection system. The following describes these three different programs.

Sewer Line Repair Program

To address ongoing sewer line repairs the City budgets $100,000 annually. This includes replacement of manholes, fixing sewer lines and broken sewer services. This is anticipated to occur over the 20-year planning horizon.

Annual Collection System Rehabilitation Program

The City is budgeting to spend $300,000 to $400,000 on improvements/rehabilitation to the collection, annually from 2014-2019. From 2020-2033, the City is anticipating to budget $400,000 annually on improvements/rehabilitation to the collection on projects separate.

Annual Sewer Line Extensions Program

The City is budgeting to spend $200,000 annually from 2014-2018, on improvements to extend sewer lines to future annexation areas or to new development within the City limits. From 2019-2033, the City is anticipating to budget $300,000 annually on sewer line extensions.

Table 7-6
Collection System Capital Improvements

Project	Cost
Additional Flow Monitoring and Data Collection	$60,000
Maitland Lift Station Improvements	$125,000
West Pasco Trunk Sewer Repair	$2,315,000
NW Area Extension	$5,297,000
9th and Washington Lift Station Upgrade – Phase 1	$677,000
Pearl Street Lift Station Improvements	$194,000
West Pasco Trunk Corrosion and Odor Control – Phase 1	$287,000
Road 44 Corrosion and Odor Control – Phase 1	$104,000
Road 44 Corrosion and Odor Control – Phase 2	$588,000
Road 44 Corrosion and Odor Control – Phase 3	$715,000
West Pasco Trunk Corrosion and Odor Control – Phase 2	$763,000
Capitol Avenue Lift Station	$939,000
9th and Washington Lift Station Upgrade – Phase 2	$754,000

Future Growth Area

To serve the growth areas within the City's planned service area, service concepts have been developed. These concepts have been broken down into smaller phases based on potential implementation sequence. Lift stations have been included for areas that do not drain by gravity to the existing collection system. See Figures 7-2 through 7-4 for the service concepts and associated opinions of costs for the build out of each of these growth areas.

The final configuration and phasing of collection system improvement will depend on future growth and development needs. The timing and funding of these projects is also dependent on growth and development pressures. The City will need to work closely with the development community in order to understand the timing and support development in these future service areas.

Northwest Service Area

Due to recent interest for development in west Pasco, the City has defined a near term capital improvement project to support the extension of sewer service in the area. The project includes approximately 9,200 feet of 30-inch sewer trunk line that will extend the West Pasco Trunk Sewer to provide service to the areas northwest of I-182, which includes the area west of Road 52 and north of Powerline Road. Capital costs are defined in Table 7-8.

Growth Areas

With the timing and sequence of development in the growth areas speculative at this time, place holders have been incorporated into the CIP to represent potential capital investments to support the development of the sewer infrastructure. As development interests begin to emerge, the City will need to reassess the timing and sequence of the potential projects and update the CIP accordingly.

Wastewater Treatment Plant Capital Improvements

The following WTP projects have been developed based on the projects identified in Section 6. Table 7-7 provides estimated costs by project. As discussed in Section 6, the majority of capital improvements identified herein represent additions and modifications to the existing treatment processes, taking maximum advantage of the existing investments the City has made at the WWTP.

Biosolids Dewatering

Dewatering of aerobically digested sludge is proposed to accommodate the City's overall solids drying capabilities through the planning period. This project consists of the installation of a two (2) screw presses in and/or adjacent to the solids handling building to dewater sludge, necessary process piping and ancillary equipment and will include conveyors and/or augers to transfer the dewatered sludge from the equipment to a truck or loader for transport to the drying beds. The City is presently in the process of implementing the improvements using City Staff.

Primary Clarification Expansion (Phases 1, 2)

Due to the limited capacity of the existing primary clarifiers, additional primary clarification is recommended to accommodate future flows. This will ultimately include the addition of two (2) primary clarifiers adjacent to the existing. The exact configuration will need to be further refined as the project is implemented, but due to the location and configuration of the existing primary clarifiers, it is anticipated that new primaries will be rectangular, similar to the existing.

The primary clarifier expansion will potentially consist of two phases to accommodate the increase in flow over time. The expansion project will consist of two (2) primary clarifiers and the flights, chains and drivers needed to mechanically clean the clarifier. Similar to the existing clarifiers, the proposed clarifiers will be 148 feet long and 18.5 feet wide. The depth however, is assumed to be deeper: 15 feet instead of eight (8) feet for greater efficiency. To accommodate the new primary clarifiers and replace the existing primary sludge pumps, a new primary sludge pumping station is proposed. This station will ultimately include up to six (6) primary sludge pumps and controls for the primary clarifiers. The existing primary sludge pumps will be removed from the process control building and anaerobic digester control building. The project will also require a new influent splitting structure and replacement of the primary effluent splitter box and flow meter.

The initial phase of the primary clarification expansion will include a primary clarifier and the primary sludge pumping station. The facilities should be developed to accommodate the second phase of expansion, the addition of a primary clarifier and associated piping, pumping and appurtenances. As part of the initial phase, a review of the project and needs should be performed to determine elements to be included in the second phase and the potential benefits of combining the improvement into one project. This review should also consider the Process Control Building Modifications, as defined herein.

Process Control Building Modifications

Modifications of the administration building are driven by the removal of the primary sludge pumps and controls completed as part of the primary clarification expansion, staff needs and compliance with applicable standards. With the removal of primary sludge pumping from the building, space on the lower floor becomes available for expansion to meet staffing needs. Staff has indicated the need for additional locker room space and staff area. This project includes remodeling of the existing primary sludge pump station and 1,200 square foot expansion of the process control building.

In addition, to comply with National Fire Protection Association (NFPA) 820, separation between the digester room and occupied space must be provided. This will most likely require an open air breezeway, physically separating the two (2) spaces. HVAC, lighting and other building support systems will need to be modified to accommodate the change in occupied spaces as noted above.

Waste Activated Sludge (WAS) Thickening

To accommodate future solids loading rates and provide system redundancy a second WAS thickening process is needed. This will include a thickening process that will complement the existing dissolved air floatation thickener (DAFT). During the last major expansion to the WWTP, much of the necessary piping and appurtenances for a second DAFT was installed and the installation of a second DAFT unit is assumed. This improvement would include the installation of a second DAFT similar to the existing unit and connecting all necessary pipes, pumps and process connections.

Alternatively, as part of the Biosolids Dewatering improvements the City is evaluating the potential to modify the piping configuration to and from their existing rotating drum screen to allow it to be used as a back-up for WAS thickening. If feasible, this alternative could be less costly than the installation of a new DAFT unit. However, to ensure budgetary planning is sufficient, the installation of a second DAFT unit is assumed.

Secondary Clarification Expansion - Secondary Clarifier 3

The addition of a third secondary clarifier will be needed to meet the state's redundancy and reliability criteria. In addition to a third 95-foot secondary clarifier, this project will also include flow spitting and site piping modifications. It is assumed that the existing Return Activated Sludge (RAS) / WAS pump building will continue to be used for this purpose with only internal mechanical changes made to accommodate the clarifier addition.

This project will also include modifications to the existing secondary clarification process including; hydraulic separation of the influent channels between the two (2) existing clarifiers, access improvements to the existing RAS/WAS pumping, repainting of the existing clarifier mechanisms and clarifier floor resurfacing.

During the preliminary design process, the placement of the clarifier will need to be reviewed as there are options to place the secondary clarifier in different locations of the plant. The specific configuration and sizing of the RAS/WAS pumping system will need to be reviewed in detail, taking into account the capability of existing pumps and the need to accommodate future Secondary Clarifier 4.

Headworks Improvements

Headworks improvements include the addition of a third vortex grit chamber to accommodate future flows. There is space south of the existing two (2) vortex grit chambers for a third similar vortex grit removal system. An expansion of the headworks building to house these improvements and ancillary equipment is anticipated. In addition this project includes replacement of aging grit classifiers and piping, redirection of the washer/compactor overflow to the influent header, channel modifications/improvements to minimize the accumulation of grit and solids in the influent channel, addition of plug or gate valves to isolate influent force mains, and replacement of manual lift isolation gates with mechanically driven isolation gates to isolate channels. This project assumes the existing grit pumps and piping can accommodate the addition of the third grit chamber. Portions of this project can be completed before the rest of the project, particularly addition of valves, replacement of gate and the channel modifications.

Secondary Treatment Nitrification

To accommodate anticipated future regulatory requirements with respect to ammonia removal, the secondary treatment process will need to be modified to consistently nitrify. During the preliminary design for this project, the specific configuration and sizing will need to be reviewed in detail, taking into account the capability of existing processes, site restrictions, future flow rates and regulatory requirements, including future requirements such as the need for phosphorous removal.

For budgetary planning purposes, this project is assumed to include new aeration basins (3.6 MG total volume), a new blower building and blowers, process control systems, sensors, probes, dewatering pumps, foam skimming equipment and site piping improvements. The new aeration basins are proposed to be located to the east of the existing basins where sludge drying beds currently exist. In this new location, the basins can be constructed without impacting the existing plant operations, have a more ideal length to width ratio, and deeper sidewater depth for more efficient oxygen transfer.

River Outfall Upgrade Phase 1

As noted in Section 6, the City's existing river outfall system will be limited in capacity as peak hour flows exceed 12 mgd. To address this deficiency, two (2) phases of river outfall improvements are proposed. In the first phase, it is recommended that a river outfall study be completed to ensure the proposed improvements will address the City's needs for the near-term and long-term flow and regulatory requirements. For the purpose of developing this capital improvement, phase 1 improvements would include 900 feet of parallel 24-inch line is proposed to be installed downstream of the 42-inch gravity line. With this modification, the capacity of the outfall structure is estimated to accommodate up to 15.1 mgd of peak hour flow.

River Outfall Upgrade Phase 2

For the second phase, the installation of a new 36-inch diameter pipe on the remaining 1,300 feet of outfall line along with a new diffuser is proposed. This will bring the capacity of the outfall system to above the project year flow requirements.

Anaerobic Digestion - Digester No. 3

To reliably meet the City's anaerobic digestion needs through the planning period, a third digester will be added. This third digester will be 66 feet in diameter with a 28.5-foot side water depth similar to the two (2) existing primary digesters. Also included in this project is an allowance for an expanded digester building to house system mechanical appurtenances (spiral heat exchangers, boilers, gas piping, etc.) and well and instrumentation and electrical systems.

Secondary Treatment Phosphorus Removal

Anticipated future regulatory requirements with respect to phosphorus removal will be addressed by modifying the secondary treatment process to accommodate biological phosphorous removal. The following discussion summarizes the additional improvements that would be necessary.

Trickling Filter and Intermediate Clarification System

The existing trickling filter removes a portion of the readily biochemical oxygen demand (BOD) that is critical to biological phosphorus removal. As such, the trickling filter and intermediate clarifier are proposed to be demolished in order to more effectively remove phosphorus.

Aeration Basin and Aeration System

With the trickling filter removed and the need to continue to nitrify as well as reduce effluent phosphorus, a number of aeration basin improvements are necessary. First off, the trickling filter will be replaced with a 0.8 mgd selector basin containing an anoxic zone followed by an anaerobic zone. The aeration RAS flow will be routed to the anoxic zone (no oxygen) to reduce nitrate levels, which impair the operation of the anaerobic zone. The denitrified RAS along with primary clarifier effluent will then be routed to the anaerobic zone. In the anaerobic zone, again, no aeration is provided and phosphorous accumulating organisms are "selected" (able to establish a competitive population). An additional 1.3 MG aerobic basin (a total of 5.2 MG of aeration basin) will also be needed along with the associated expansion of the aeration system (blowers, air piping , diffusers, etc...).

Secondary Clarification Expansion - Secondary Clarifier 4

It is predicted that a fourth secondary clarifier will be needed near the end of the planning period due to the need to maintain the clarifier solids loading below the stated design criteria and provide redundancy. In addition to the new 95-foot secondary clarifier, this project will also include flow spitting and site piping modifications. As with the addition of Secondary Clarifier 3, it is assumed that the existing RAS/WAS pump building will continue to be used for this purpose with only internal mechanical changes made to accommodate the clarifier addition.

Water Reclamation Facility

Section 6 identified a water reclamation project to promote the use of reclaimed water within the community. This project would take a small portion of the effluent, approximately 150 gpm, and provide treatment to achieve a Class A reclaimed water source. To meet Class A standards coagulation and filtration would need to be provided and disinfection of the reclaimed water after treatment is recommended using sodium hypochlorite. Reclaimed water would be used for irrigation purposes on City and potentially Port property in the vicinity of the treatment plant.

To accommodate irrigation needs a storage pond would be created with enough volume to accommodate variable irrigation demands. This pond could also be used as a water feature in the area as part of a larger demonstration project. The reclaimed water demonstration project could also include an interpretative center at the treatment plant site to demonstrate the versatility of reclaimed water. This feature could include landscaping, ponds, constructed migratory bird habitat, trails, parking lot, as well as access to the trails along the river. See Figure 7-5 for water reuse concept.

Although this project is not identified as a near term capital improvement project and its scope is not clearly defined, the City should continue to explore and peruse opportunities to use reclaimed water. As discussed in Section 6, the City should seek out teaming partners to help promote and potentially fund a water reclamation project.

Wastewater Treatment Plant Recommended Capital Improvement Projects

Figure 7-6 is provided at the end of this section and shows the locations of the recommended capital improvement projects. Table 7-7 summarizes the total project cost estimate for each improvement. More details cost estimates are provided in the Appendix D.

Table 7-7
Wastewater Treatment Plant Capital Improvements

Improvement	Total Project Cost Estimate
Primary Clarification Expansion Phase 1	$2,340,000
Primary Clarification Expansion Phase 2	$1,547,000
Process Control Building Modifications	$819,000
Waste Activated Sludge Thickening	$883,000
Secondary Clarification Expansion - Secondary Clarifier 3	$3,016,000
Headworks Improvements	$2,015,000
Secondary Treatment - Nitrification	$11,592,000
River Outfall Upgrade Phase 1	$561,000
Anaerobic Digestion - Digester No. 3	$5,540,000
River Outfall Upgrade Phase 2	$1,913,000
Secondary Treatment - Phosphorus Removal	$6,541,000
Secondary Clarification Expansion - Secondary Clarifier 4	$2,690,000

Capital Improvement Program

The collection system and wastewater treatment plant capital improvement projects defined herein were reviewed with City staff to inventory and prioritize improvements based on system needs, anticipated system growth and available funding. Many of the capital projects, particularly at the WWTP, are triggered by anticipated future flow conditions, therefore the timing and prioritization of these improvements are based on the year in which flows are projected.

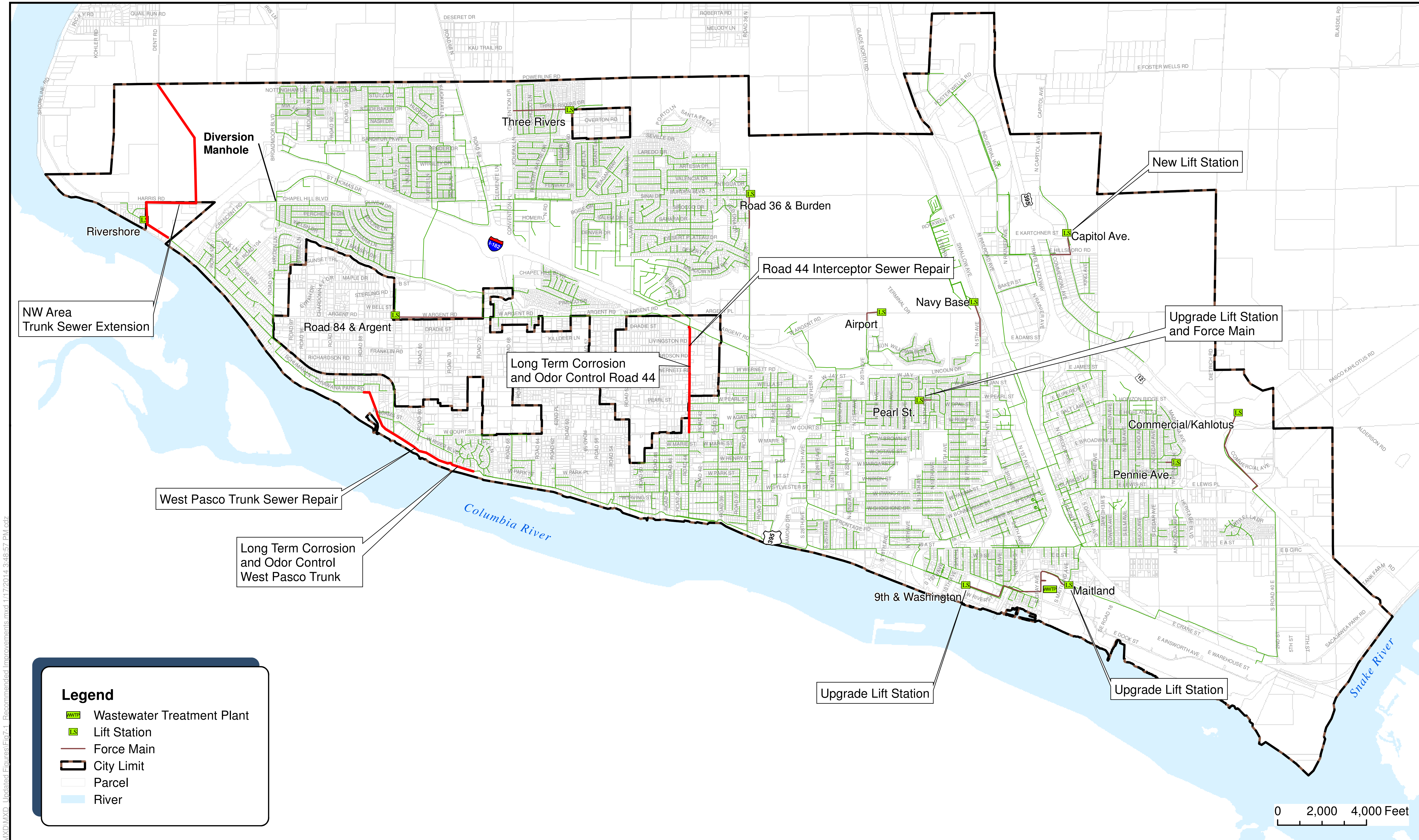
Table 7-8 presents the Wastewater Collection and Treatment System Capital Improvement Program through the planning period. Figures 7-1 and 7-6 indicate the location of these improvements. The Capital Improvement Program identifies near-term projects in the first six (6) years, by year, followed by project in the next five (5) years and projects in the following 10-year planning period though 2033. Included in Table 7-8 are currently planned capital improvements that the City defined before the planning.

Table 7-8
City of Pasco
Comprehensive Sewer Plan - Capital Improvement Program

Wastewater Treatment Plan Improvement Project Description	Need[1]	Est. Cost (x1000)	Planned Year of Project and Estimated Cost in 2013 $'s (x 1000)																				
			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Biosolids Dewatering	**System Growth/Expansion**			$500																			
Primary Treatment Expansion/Improvement - Primary Clarifier No. 3	**Flow**	$2,340		$250	$2,090																		
Waste Activated Thickening	**System Growth/Expansion**	$883					$106	$777															
Secondary Clarification Expansion/Improvement Phase 1	**Flow**	$3,016							$348	$2,668													
Headworks Improvements	**Condtion**	$2,015							$700	$1,315													
Secondary Treatment - Nitrification	**Regulatory**	$11,592								$500	$1,300	$4,896	$4,896										
River Outfall Upgrade Phase 1	**Flow**	$561								$68	$493												
Primary Treatment Expansion/Improvement - Primary Clarifier No. 4	**Flow**	$1,547									$150	$1,397											
Process Building	**System Growth/Expansion**	$819											$95	$724									
Anaerobic Digestion - Digester No. 3	**Flow**	$5,540													$660	$2,440	$2,440						
River Outfall Upgrade Phase 2	**Flow**	$1,913														$230	$1,683						
Secondary Treatment - Phosphorus Removal	**Regulatory**	$6,541																			$785	$2,878	$2,878
Secondary Clarification Expansion/Improvement Phase 2	**Flow**	$2,690																				$310	$2,380
TOTAL - ALL IMPROVEMENTS		**$39,457**	**$0**	**$750**	**$2,090**	**$0**	**$106**	**$777**	**$1,048**	**$4,551**	**$1,943**	**$6,293**	**$4,991**	**$724**	**$660**	**$2,670**	**$4,123**	**$0**	**$0**	**$0**	**$785**	**$3,188**	**$5,258**

Collection System Improvement Project Description	Need[1]	Est. Cost (x1000)	Planned Year of Project and Estimated Cost in 2013 $'s (x 1000)																				
			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Additional Flow Monitoring and Data Collection	**Condition**	$60		$60																			
Maitland Lift Station Improvements	**Condition**	$125		$125																			
West Pasco Trunk Sewer Repair	**Condition**	$2,315		$446	$1,870																		
9th and Washington Lift Station Improvements - Phase 1	**Condition**	$677			$78	$599																	
Pearl Street Lift Station Improvements	**Condition**	$194			$23	$171																	
West Pasco Trunk Corrosion and Odor Control - Phase 1	**Condition**	$287				$28	$259																
Road 44 Corrosion and Odor Control - Phase 1	**Condition**	$68					$18	$50															
Road 44 Corrosion and Odor Control - Phase 2	**Condition**	$624						$57	$567														
Road 44 Corrosion and Odor Control - Phase 3	**Condition**	$715							$83	$632													
West Pasco Trunk Corrosion and Odor Control - Phase 2	**Condition**	$763								$88	$675												
9th and Washington Lift Station Improvements Phase 2	**Flow**	$754																				$87	$667
Chapel Hill Blvd. Extension - Sewer	**System Growth/Expansion[2]**	$550						$50	$500														
Sewer Line Extension - Rd 100	**System Growth/Expansion[2]**	$500						$50	$450														
Capitol Lift Station	**System Growth/Expansion[2]**	$939										$108	$831										
East Lift Station (Riverview Area)	**System Growth/Expansion[3]**	$1,339								$268	$1,071												
30" Main (Northwest Area)	**System Growth/Expansion[3]**	$5,297		$397	$4,900																		
24" Main (Northwest Area)	**System Growth/Expansion[3]**	$7,152												$900	$3,000	$3,252							
North Lift Station (Southeast Industrial Area)	**System Growth/Expansion[3]**	$1,404												$400	$1,004								
21" Main (Northwest Area)	**System Growth/Expansion[3]**	$2,242													$700	$1,542							
West Lift Station (Northwest Area)	**System Growth/Expansion[3]**	$1,694															$1,694						
30" Main (Southeast Industrial Area)	**System Growth/Expansion[3]**	$2,669															$400	$2,269					
West Lift Station (Riverview Area)	**System Growth/Expansion[3]**	$1,028															$200	$828					
East Lift Station (Northwest Area)	**System Growth/Expansion[3]**	$1,860																$200	$1,660				
Annual Sewer Line Re-lining Program[4]	**Condition**	$7,700	$904	$400	$300	$300	$300	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400
Annual Sewer Line Extensions	**System Growth/Expansion**	$5,500	$90	$200	$200	$200	$200	$200	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300
Sewer Line Repair[5]	**Condition**	$2,000	$50	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100
TOTAL - ALL IMPROVEMENTS		**$48,457**	**$1,044**	**$1,728**	**$7,471**	**$1,398**	**$877**	**$907**	**$2,400**	**$1,788**	**$2,546**	**$908**	**$1,631**	**$2,100**	**$5,504**	**$5,594**	**$3,094**	**$4,097**	**$2,460**	**$800**	**$800**	**$887**	**$1,467**
TOTAL - WASTEWATER TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS		**$87,914**																					

Notes
1. Need is defined as the justification for the CIP Improvement and is characterized by four general categories:
- Flow – To accommodate the anticipated wastewater flow and/or loadings
- Condition – Existing facilities require replacement and/or rehabilitation due to their condition and/or service life limitations
- System Growth/Expansion – To support the continued growth and expansion of the system to accommodate a growing service area and population base
- Regulatory – To comply with current or future regulations and permit requirements
2. City planned project prior to CSP.
3. Potenital growth area capital improvements.
4. Includes Road 44 Interceptor Sewer Repair in 2013 budget.
5. This line item is part of the yearly operations and maitenance budget and is just shown for informational purposes.

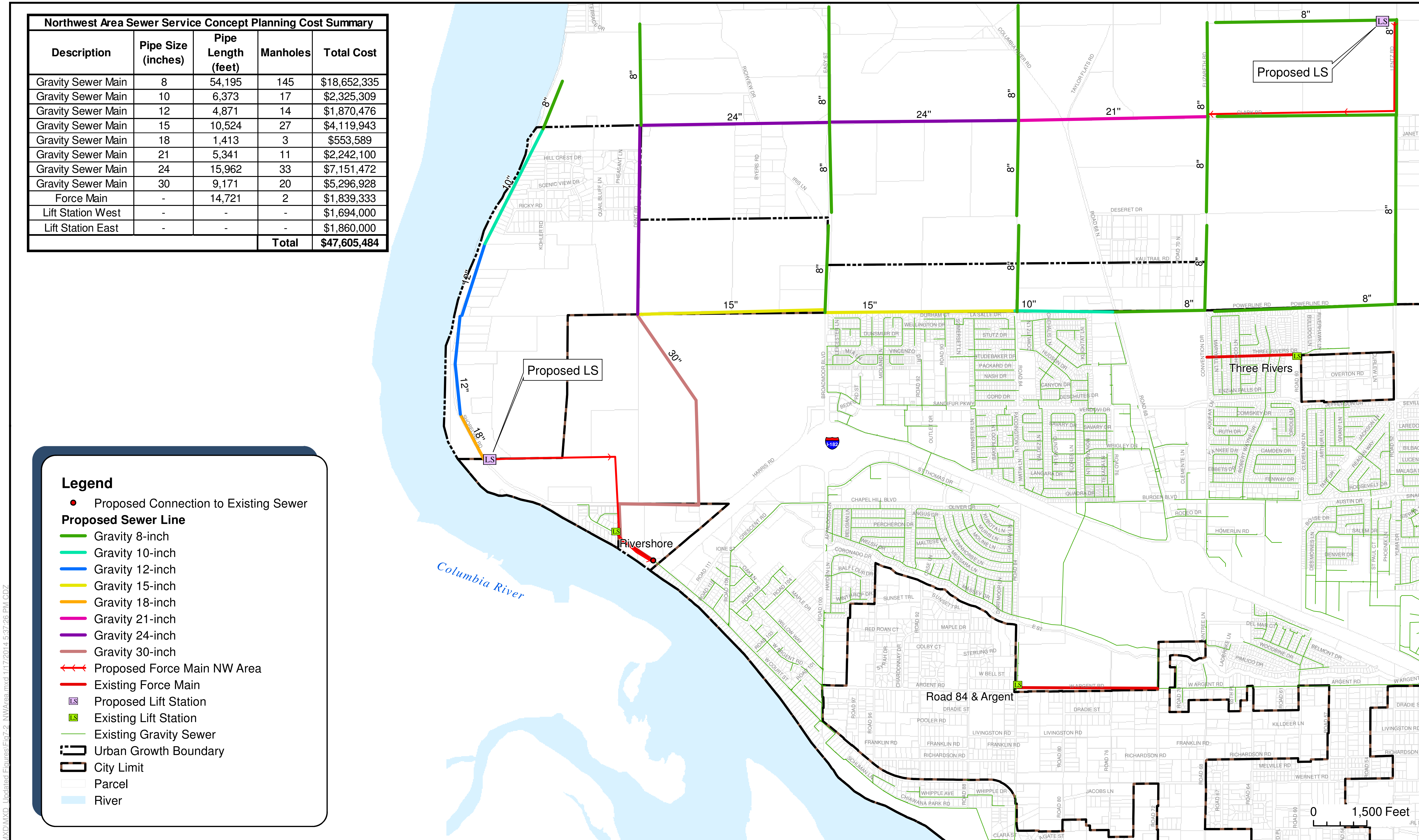


Comprehensive Sewer Plan

Figure 7-1
Collection System
Capital Improvement Projects

January 2014 11-1261

Northwest Area Sewer Service Concept Planning Cost Summary				
Description	Pipe Size (inches)	Pipe Length (feet)	Manholes	Total Cost
Gravity Sewer Main	8	54,195	145	$18,652,335
Gravity Sewer Main	10	6,373	17	$2,325,309
Gravity Sewer Main	12	4,871	14	$1,870,476
Gravity Sewer Main	15	10,524	27	$4,119,943
Gravity Sewer Main	18	1,413	3	$553,589
Gravity Sewer Main	21	5,341	11	$2,242,100
Gravity Sewer Main	24	15,962	33	$7,151,472
Gravity Sewer Main	30	9,171	20	$5,296,928
Force Main	-	14,721	2	$1,839,333
Lift Station West	-	-	-	$1,694,000
Lift Station East	-	-	-	$1,860,000
			Total	$47,605,484



Comprehensive Sewer Plan

Figure 7-2
Northwest Area-Service Concept

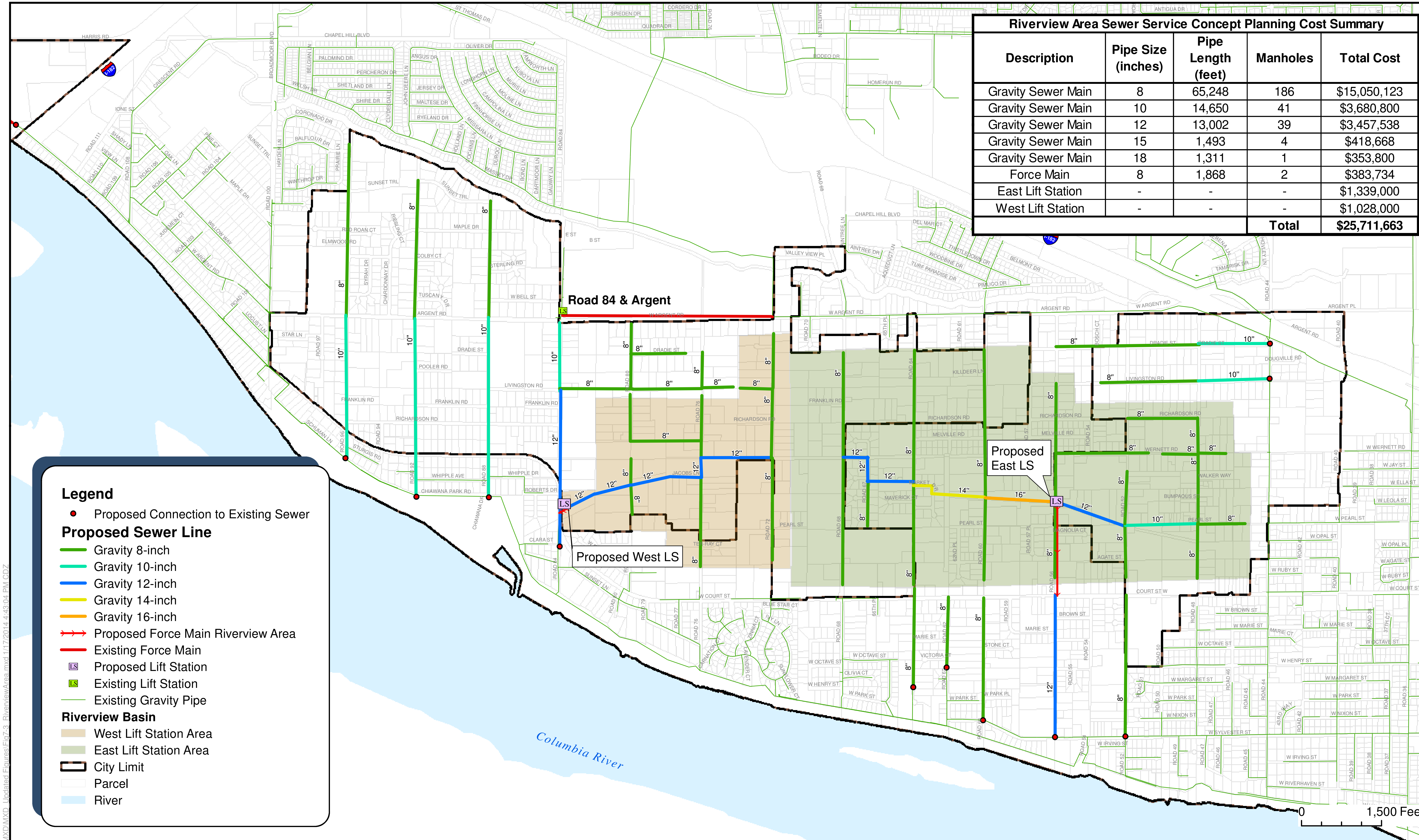
MSA Murray, Smith & Associates, Inc.

City of PASCO

January 2014 11-1261

Riverview Area Sewer Service Concept Planning Cost Summary

Description	Pipe Size (inches)	Pipe Length (feet)	Manholes	Total Cost
Gravity Sewer Main	8	65,248	186	$15,050,123
Gravity Sewer Main	10	14,650	41	$3,680,800
Gravity Sewer Main	12	13,002	39	$3,457,538
Gravity Sewer Main	15	1,493	4	$418,668
Gravity Sewer Main	18	1,311	1	$353,800
Force Main	8	1,868	2	$383,734
East Lift Station	-	-	-	$1,339,000
West Lift Station	-	-	-	$1,028,000
			Total	**$25,711,663**



MSA Murray, Smith & Associates, Inc.

CITY OF PASCO

Comprehensive Sewer Plan

Figure 7-3
Riverview Area-Service Concept

January 2014 11-1261

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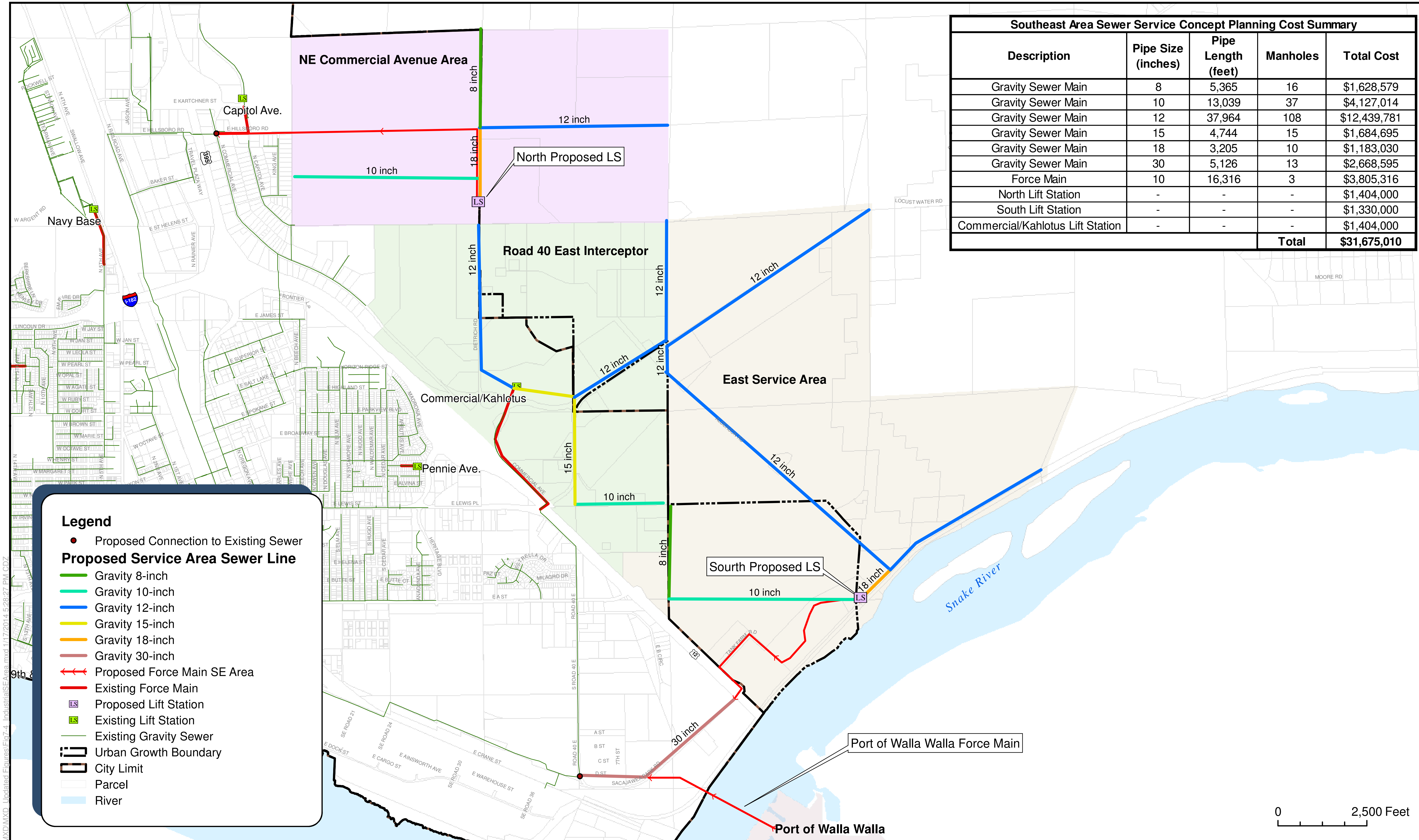

Southeast Area Sewer Service Concept Planning Cost Summary

Description	Pipe Size (inches)	Pipe Length (feet)	Manholes	Total Cost
Gravity Sewer Main	8	5,365	16	$1,628,579
Gravity Sewer Main	10	13,039	37	$4,127,014
Gravity Sewer Main	12	37,964	108	$12,439,781
Gravity Sewer Main	15	4,744	15	$1,684,695
Gravity Sewer Main	18	3,205	10	$1,183,030
Gravity Sewer Main	30	5,126	13	$2,668,595
Force Main	10	16,316	3	$3,805,316
North Lift Station	-	-	-	$1,404,000
South Lift Station	-	-	-	$1,330,000
Commercial/Kahlotus Lift Station	-	-	-	$1,404,000
			Total	$31,675,010

MSA Murray, Smith & Associates, Inc.

CITY OF PASCO

Comprehensive Sewer Plan

Figure 7-4
Southeast Industrial Area-Service Concept

January 2014 11-1261

MSA Murray, Smith & Associates, Inc.

CITY OF PASCO

Comprehensive Sewer Plan

Figure 7-5
Water Reuse Facility Concept

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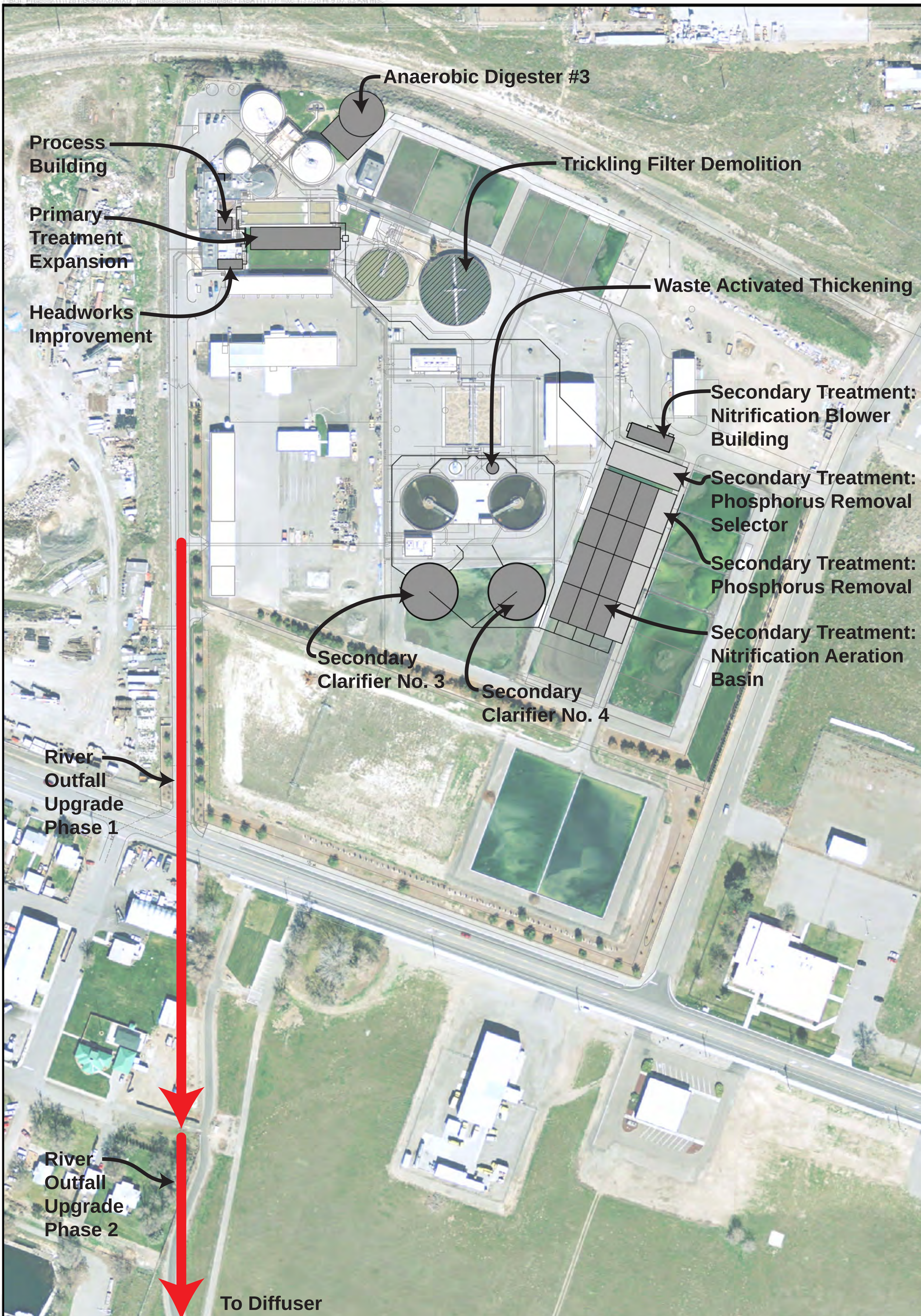

MSA
Murray, Smith & Associates, Inc.

Comprehensive Sewer Plan

Figure 7-6
Watewater Treatment
Plant Improvements

CITY OF PASCO

January 2013 11-1261

MSA

Section 8

SECTION 8
FINANCIAL CONSIDERATIONS

Introduction

Previous sections have outlined an overview of the existing system, projections of future growth, an analysis of existing and future wastewater collection and treatment system needs and defined a Capital Improvement Program (CIP) based on those needs. This section summarizes the funding strategy developed by the City of Pasco (City) to fund capital improvement projects and its impact on the sewer utility's rate structure. Also presented in this section is a summary of funding alternatives typically available to public agencies in Washington State.

The City's Public Works Department reviews and updates the budget for the sewer utility on an annual basis; this includes a review on the operating budget and CIP. The information is provided to the City's Finance Department and incorporated into the City's overall budget. The City's Finance Department establishes the sewer rate based on the utility needs.

Capital Improvement Funding

The City has historically used sewer rates and bonds to finance capital improvement projects. For large projects that require significant capital in a short period of time, bonds are typically used as the funding mechanism. Bonds are issued no more than once every two years. For other projects that provide specific benefit to a group or an area, the City has used other, more targeted funding options, such as Utility Local Improvement Districts.

Rate Impact

The City utilizes a sewer rate structure to fund operations, capital expenditures and debt service for the sanitary sewer system. Utility rates are reviewed at least every two (2) years for possible adjustment to meet operation needs, accommodate the first two (2) years of capital expenditures planned in the City's six (6) year CIP and provide debt service. As policy, the City does not set rates more than two years in advance in order to avoid unnecessary rate fluctuations and ensure rates represent the utility expenditures.

The City's current rate structure was reviewed with the CIP funding needs by the City's Finance Department and a strategy for funding developed internally by the City. The following is a summary of the impact of the CIP on the City's residential sewer rate as determined by the City over the next ten years. The City uses a household growth factor of one percent per year in their analysis.

Table 8-1
Summary of Residential Sewer Rate Impact

Year	Residential Sewer Rate	Percent Increase
Current (2014)	$24.80	
2016	$25.98	4%
2022	$26.50	2%

Capital Improvement Financing

There are different options for financing capital improvement projects, and typically they include pay-as-you-go or reserve funding, debt financing, grants or a combination of resources. Financing from outside sources in the form of privatizing or leasing facilities may also be an option for some improvements. The appropriateness of each option depends on City policies and the nature of the improvement.

Pay-As-You-Go

Pay-as-you-go financing allows operating and capital costs to be funded based on the rate of revenues collected from the monthly user charges, connection fees and/or assessments. Pay-as-you-go financing is most often used for smaller projects, since financing larger projects with this method may produce dramatic shifts in customer charges and revenue requirements from year to year. However, reserve funds may be built up over a period of years to provide funding for future projects without changing rates each year. A benefit of using pay-as-you-go funding is avoiding the added interest and issuance expenses associated with debt financing. A downfall of this method is that it may place the burden of financing long-term projects on existing customers and it may decrease customer user rate stability.

Bonds

Certain types of capital improvements may be financed by issuing long-term debt. Projects which are large and costly in relation to a City's financial resources, which have a long useful life, and which are not frequently re-occurring, are appropriate items to be financed by bonds. Using bonds to finance larger capital projects that have an extended useful life allows the cost of those facilities to be financed by existing as well as future customers that benefit from the improvements. This provides an equitable method for recovering costs over the useful life of a project and does not unduly burden current residents.

The amount that a local agency may borrow to finance a project varies depending upon the amount of financing being sought, the agency's debt-paying capacity or credit rating, and the relationship of its outstanding debt to the statutory limitation on debt.

Interest rates on bonds also vary depending upon the type of bond, the amount of funds securing the bond, prevailing market conditions, and the term of the bonds, as well as other factors. General obligation (GO) bonds, revenue bonds and special assessment bonds can all be used to finance improvements.

GO bonds are supported by property taxes. Financing construction with GO bonds places the costs in proportion to the assessed value of properties rather than the amount or type of sewage produced. Financing a capital improvement with GO bonds is accomplished in the following manner:

1. The engineer prepares a detailed cost estimate on the construction.
2. An election is held to ascertain whether or not the public wants the bonds to be sold to finance the improvement.
3. If the bond issue receives voter approval, construction begins and the project is funded by interim financing.
4. Once the project is completed and exact project cost determined, the bonds are sold.

If the project directly benefits the entire community, the bonds are normally retired with revenues generated by a uniform and valorem tax. However, if the project benefits only a segment of the community, the bonds are retired by special assessments or other funds received from benefiting property owners or service recipients.

Revenue bonds are supported by the income generated from monthly sewage charges. Existing and new sewer system customers pay for any bonds outstanding through assessments or monthly user rates. The sewer rates must be high enough to pay system O&M costs plus the annual principal and interest cost (debt service) of the bond issue. For investors to buy revenue bonds, the rates must provide a cushion of revenue called debt service coverage. The normal coverage requirement is 25 to 40 percent of the annual debt service, depending on the financial strength of the bond issuer. This amount must be collected from revenues and be available each year that the bonds are outstanding. However, the excess funds collected can be used in subsequent years to pay for improvements.

Interim Financing

Although it is technically possible to levy a special assessment in advance of the completion of a capital improvement, to do so has the disadvantage of requiring a second assessment or a refund in the event that the final costs of the improvement differ from the estimates when implementing an LID. Therefore, it is necessary to use other means to pay for the work, performed prior to the actual assessment.

A common interim finance practice is for a City to issue GO warrants in anticipation of the revenue to be collected through special assessments. The jurisdiction or project contractors convert these warrants into cash by pledging them as security to lending institutions.

Another interim financing method involves the use of a revolving fund. Such an account holds funds derived from general bond issues, service charges, tax receipts, etc. A number of revolving funds may exist. Each fund is related to a specific category of capital improvements and all or a portion of its funds may be used to finance interim costs associated with those improvements for which the fund is intended. Once the project is completed, the fund is reimbursed with proceeds from special assessments or debt proceeds, as well as other funds.

Using a revolving fund for interim financing has the advantage of eliminating the cost and complications involved in issuing GO debt. Of course, an even less complicated interim financing source than a revolving fund is the general fund. If a surplus is available, the cost of a project may be charged against the general fund. Once the project is completed, the general fund is reimbursed with proceeds from assessments, bonds, etc.

Privatization

The use of the private sector to finance wastewater and sanitary sewer collection system facilities is becoming a more common method of financing capital facilities. The private finance option involves ownership of the capital facilities by entities other than the City. Typically, for new capital facilities, a private entity will finance, design, build, and operate the new facilities, and once completed, charge the City a user fee that recovers over the life of the facility, the capital and operation and maintenance costs. Privatization can involve the private entity undertaking all aspects of the project, just financing the new facilities or actually purchasing existing facilities and leasing them back to the City to operate.

Leasing

Leasing is similar to privatization, except that it is much less complex, and only the equipment is privatized (i.e., not the building, land, and services). Advantages and disadvantages for leasing are similar to privatization except that the control of operations is maintained by the City. Leasing may be beneficial if there are debt limitations restricting the purchase of equipment and needed facilities. Other stated advantages are that facilities may be built quicker and cheaper through lease arrangements because there tend to be fewer delays for private industry. The lease could be written so that City would have the option to purchase the facility or equipment at the end of the lease. The most probable source of lease financing would be available through large banks, equipment manufacturers, real estate development firms and major leasing companies.

Ad Valorem Taxes

Agencies may utilize revenues derived from ad valorem taxation to repay certain capital improvement loans if they have taxing authority. This method of financing distributes construction costs among all properties in the taxing jurisdiction. The tax on each property is apportioned on the basis of individual assessed values. The use of ad valorem taxation is most appropriate for special purpose districts and small communities—where projects are essentially local in character and the benefits of the improvements to properties within the jurisdiction are relatively uniform. However, many communities choose to limit the use of taxes to services that do not generate revenues (i.e. sewer rates).

Wastewater Grants and Loans

The state and the federal governments provide grants and loan funds for financing infrastructure improvements. The City may be able to obtain financing for some or all the recommended improvements at a lower cost than alternative funding sources by applying for grants and/or loans available to public agencies. However, the grant and loan programs are competitive, may require a match of local funds, and can have restrictions on the types of improvements that can be funded. Some of the programs available to Washington cities are listed below.

Public Works Trust Fund (PWTF)

The Washington State Department of Community Trade and Economic Development, through the Public Works Board, manages the PWTF, which provides low-interest revolving loans to help local governments finance public works needs. Eligible projects include repair, replacement, rehabilitation, reconstruction, and improvement of sanitary sewers. Funding is provided to meet current standards for existing users and may include reasonable growth as part of the project. Funding is not available for operations and maintenance costs. Loans may also be used for emergency planning and capital improvement planning. Applications for construction projects are accepted from March to May and funds are awarded the following year.

Community Development Block Grant (CDBG) Entitlement Community Grants

The federal CDBG provides funds made available from the U.S. Department of Housing and Urban Development as an annual entitlement. The CDBG entitlement program allocates annual grants to larger cities and urban counties to develop viable communities by providing decent housing, a suitable living environment, and opportunities to expand economic opportunities, principally for low- and moderate-income persons. CDBG funds may be used to rehabilitate existing public infrastructure provided that the service area is predominantly low or middle income and primarily residential. In addition, individual low to moderate income home owners may qualify for zero interest CDBG loans to make certain home improvements such as connecting to the sewer system.

*Washington State Centennial Clean Water Fund (CCWF***)**

The Washington State Department of Ecology (Ecology) provides CCWF grants and loans for planning, design construction, or implementation of water pollution control facilities and other activities to meet state or federal requirements and protect water quality.

After regulatory changes in 2000, there has been shift away from providing grants offering loans to fund facilities construction projects. Loans may be used for site-specific facilities planning, design, and construction of point source facilities, land acquisition, and installing collection sewers and side sewers. Loans are available for up to 100 percent of the eligible project cost and grants may be available for up to 50 percent of the eligible project costs where financial hardship can be demonstrated. Applicants may be considered for financial hardship terms if their proposed projects would cause user charges to exceed 1.5 percent of the median household income. Grants for non-point source activities are available for up to 75 percent of eligible costs. The Ecology loans can be used to make up the local match required for grants. Grants are only available to help mitigate financial hardship.

CCWF funds are intended to be used for existing residential service needs and reasonable amounts of growth. The CCWF program allows loans for the portion of the project up to 110 percent of existing need, with the portion above 110 percent being considered excess capacity. To be eligible for a CCWF grant or loan, capital improvement projects must be identified in the agency's Comprehensive Plan. In addition, the CCWF operates under a Step Process, which requires that an approved facilities plan must be completed before applying for design funding, and an approved engineering report with design specifications must be completed before applying for construction funding. Applications are accepted in the fall of each year.

Washington State Revolving Fund Loans (SRF)

The Ecology manages the SRF, which can be used to pay for water pollution control projects such as sanitary sewer projects including secondary sewer treatment facilities and other water pollution control projects. SRF funds are intended to be used for existing residential service needs and reasonable amounts of growth. The SRF program allows loans for existing needs plus capacity for 20 years of growth based on GMA plans. Capacity beyond 20 years is considered excess capacity.

Ecology administers the SRF program in conjunction with the CCWF program and the Step Process, interest rates, loan terms and financial hardship considerations are the same for both programs. Applications are accepted in the fall of each year.

Also through the SRF the City has the option sewer utilities to make loans to property owners to pay for sewer installations and then be reimbursed with interest over time. Rural Development and the SRF also offer funds to help communities set up their own revolving fund loan programs to help customers to pay for the cost of switching from onsite septic systems to the City's sewer system. These loans can spread out some of the financial burden, of the customers cost of converting to sewer from septic, and meet the City’s objectives of hooking customers up to the sewer system in annexed areas.

Section 9

SECTION 9
COMMUNITY OUTREACH AND ENVIRONMENTAL DOCUMENTATION

Community Outreach

The Comprehensive Sewer Plan process included a community outreach element that included presentations at City of Pasco (City) Council meetings, workshops and a public open house. The intent of the community outreach was to present information on the scope, progress and results of the comprehensive planning process and solicit input for the City Council and general public.

The following is a brief summary of the meetings that have been conducted as part of the Comprehensive Sewer Plan process. Presentations from each meeting are contained in Appendix E.

Council Meeting, September 12, 2011

Prior to beginning work on the Comprehensive Sewer Plan, a presentation was made to the City Council that outlined the general approach, project goals, tasks and end results of the comprehensive sewer planning process.

Open House, April 18, 2012

A public open house was conducted in Council Chambers to review the comprehensive sewer planning process and receive input from the general public. The general project approach was reviewed along with the progress to date, including the results of collection and treatment systems analyses. The next steps in the comprehensive planning process, include alternatives analysis and defining capital improvements, were discussed.

Council Meeting, January 28, 2013

An update on the Comprehensive Sewer Plan was presented to City Council. The update included a briefing on the work to date, results of collection and treatment systems analyses and the evaluation of alternatives. The City Council was also presented with the draft Capital Improvements Plan and the outline of the next steps to complete the planning process.

Environmental Documentation

A State Environmental Policy Act (SEPA) Checklist has been prepared to ensure environmental values are considered by state and local official in the development of the Comprehensive Sewer Plan. The SEPA checklist is presented in Appendix F.

The SEPA Checklist was prepared to meet the minimum requirements of a planning document but, depending on the scope and financing of improvements, may not be sufficient to implement the proposed improvements identified in the Comprehensive Sewer Plan, particularly where state or federal grants or loans are involved. Additional environmental documentation may be necessary depending on the scope of the project and funding source. Each capital improvement project should be evaluated on an individual basis to determine the needed environmental documentation, reviews and permits.

APPENDIX A

FACT SHEET FOR NPDES PERMIT WA-004496-2
CITY OF PASCO WASTEWATER TREATMENT WORKS

PURPOSE of this Fact Sheet

This fact sheet explains and documents the decisions Ecology made in drafting the proposed National Pollutant Discharge Elimination System (NPDES) Permit for the City of Pasco Treatment Works.

This fact sheet complies with Section 173-220-060 of the Washington Administrative Code (WAC), which requires Ecology to prepare a draft permit *and accompanying fact sheet* for public evaluation before issuing an NPDES permit.

Ecology makes the draft permit and fact sheet available for public review and comment at least 30 days before issuing the final permit. Copies of the fact sheet and draft permit for the City of Pasco Wastewater Treatment Works, NPDES Permit **WA-0044962,** are available for public review and comment from May 12, 2010 until June 11, 2010. For more details on preparing and filing comments about these documents, please see **Appendix A - Public Involvement**.

The City of Pasco's wastewater utility staff reviewed the draft permit and fact sheet for factual accuracy. Ecology corrected any errors or omissions regarding the facility's location, history, discharges, or receiving water.

After the public comment period closes, Ecology will summarize substantive comments and provide responses to them. Ecology will include the summary and responses to comments in this Fact Sheet as **Appendix D - Response to Comments**, and publish it when issuing the final NPDES permit. Ecology will not revise the rest of the fact sheet, but the full document will become part of the legal history contained in the facility's permit file.

SUMMARY

The City of Pasco Wastewater Treatment Works discharges to the Columbia River. The treatment facilities generally produce an excellent quality effluent. Past exceptions were usually related to illegal discharges into the sewer collection system resulting in minor inhibitory or toxic impacts on the biological community in the aeration basin. The wastewater treatment plant staff has been optimizing solids handling to better mitigate impacts from recycled solids. The facility has added a solids thickening drum and improvements to the digesters have been made. Changes in the proposed permit from the previous permit are primarily a compliance schedule requiring submission of an engineering report suitable for approval. The engineering report must evaluate the hydraulic and organic loading capacity of the City of Pasco's wastewater facilities as they currently exist and if necessary recommend upgrades appropriate for the wastewater facilities to provide twenty years of additional service to the community.

TABLE OF CONTENTS

I. INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later amendments in 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One mechanism for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System (NPDES), administered by the federal Environmental Protection Agency (EPA). The EPA authorized the State of Washington to manage the NPDES permit program in our state. Our state legislature accepted the delegation and assigned the power and duty for conducting NPDES permitting and enforcement to Ecology. The legislature defined Ecology's authority and obligations for the wastewater discharge permit program in 90.48 RCW (Revised Code of Washington).

The following regulations apply to municipal NPDES permits:

- Procedures Ecology follows for issuing NPDES permits (chapter 173-220 WAC)
- Technical criteria for discharges from municipal wastewater treatment facilities (chapter 173-221 WAC)
- Water quality criteria for surface waters (chapter 173-201A WAC) and for ground waters (chapter 173-200 WAC)
- Sediment management standards (chapter 173-204 WAC)
- Submission of Plans and Reports for Construction of Wastewater Facilities (Chapter 173-240 WAC)

These rules require any treatment facility operator to obtain an NPDES permit before discharging wastewater to state waters. They also help define the basis for limits on each discharge and for requirements imposed by the permit.

Under the NPDES permit program and in response to a complete and accepted permit application, Ecology must prepare a draft permit and accompanying fact sheet, and make them available for public review before final issuance. Ecology must also publish an announcement (public notice) telling people where they can read the draft permit, and where to send their comments, during a period of thirty days (WAC 173-220-050). (See **Appendix A - *Public Involvement*** for more detail about the public notice and comment procedures). After the public comment period ends, Ecology may make changes to the draft NPDES permit. Ecology will summarize the responses to comments and any changes to the permit in **Appendix D.**

II. BACKGROUND INFORMATION

Table 1: General Facility Information

Applicant:	City of Pasco
Facility Name and Address:	Wastewater Treatment Plant 1015 South Grey Street Pasco, WA 99301
Type of Treatment:	Advanced Secondary treatment with ultraviolet light disinfection.
Discharge Location:	Columbia River at RM 327.6 of the McNary Pool reach of the river. Lake Wallula Latitude: 46° 12' 58" N Longitude: 119° 05' 12" W.

Figure 1: Facility Location Map

A. Facility Description

The City of Pasco owns and operates an activated sludge process domestic wastewater treatment plant designed to oxidize, nitrify and disinfect wastewater with ultraviolet light radiation. Ecology provided financial assistance with the expectation that the treatment plant would remove ammonia and chlorine from the receiving environment and eliminate non-compliance issues. The facility is classified as an EPA major discharger and discharges to the Lake Wallula reach of the Columbia River.

History

Pasco originally built the wastewater treatment plant in 1954 as a primary treatment facility. In 1970, it constructed a trickling filter so that the plant could meet secondary treatment requirements. The 1970 addition of a secondary treatment process increased the plant's design population equivalent to 30,000. The most recent upgrade (1998) increased the design population equivalent to 43,500. During the last permit cycle, the City upgraded the solids handling facilities, digestion and solids thickening. These improvements likely increased the overall treatment works capacity.

Collection System Status

The City of Pasco submitted a Comprehensive Sewer Plan to Ecology in December 1992 and updated it in 1999. The City submitted a facility plan with supplements in 1993, which was approved in February 1994. The plan proposed improvements to the City's collection system, wastewater treatment facility and pumping stations. The City has replaced the pumping stations at the intersection of 9th and Washington and at the intersection of 5th and Ainsworth with a single pump station at 9th and Washington resulting in the elimination of an overflow. It also replaced the old “Navy” pump station in the industrial area east of the airport. Areas in West Pasco and East Pasco have been added to the sewerage system. The Port of Pasco abandoned the wastewater stabilization lagoons serving its facilities on Ainsworth and the City now serves the area by a trunk sewer connected to its sewerage system. The City’s collection system consists of gravity sewers from 8 inches to 36 inches in diameter, pump stations and pressure piping.

Treatment Processes

The current wastewater treatment facility includes:

- A headworks building with grit removal.
- Screening equipment and inlet piping.
- An operations building and laboratory.
- A renovated primary clarifier and trickling filter (new distributor).
- Secondary process elements designed to provide nitrification - aeration basins.
- Secondary clarifiers with lime addition for alkalinity and pH control.
- Ultraviolet disinfection.
- Anaerobic digesters.
- Renovated and expanded sludge digestion processes with the addition of a solids drum thickener and a sludge drying bed.

The City's rate of growth is reflected in the increase in flows. The wastewater treatment works design is based on the presumed need to nitrify and avoid toxic effects from ammonia in the Columbia River. At the time the City's outfall was an end of pipe in the river. While the wastewater treatment plant was built to nitrify, consideration was also given to extend the outfall further into the river and add a multi-port diffuser. The installation of the outfall negated the need to nitrify in terms of water quality based effluent limitations. In August 2005, the City commissioned an engineering evaluation of the wastewater treatment facilities capacity. Until recently, the wastewater treatment works was being operated in a nitrifying mode in order to minimize the generation of biosolids.

The treatment facilities generally produce an excellent quality effluent. Past exceptions were usually related to illegal discharges into the sewer collection system resulting in minor inhibitory or toxic impacts on the biological community in the aeration basin. Some violations were related to how recycle of solids was handled. The wastewater treatment plant staff has been optimizing solids handling to better mitigate impacts from recycled solids. The facility has added a solids thickening drum and improvements to the digesters have been made. The 2005 assessment of the wastewater treatment facilities capacity pointed that solids handling was a critical capacity limiting factor. With the new digester it is time to reassess the capacity of the facility and its ability to serve the community.

The WWTP is an activated sludge treatment plant with a flow between 1 MGD and 10 MGD. As such, it is a class III facility according to **WAC 173-230-140; *Classification of Wastewater Treatment Plants*.**

Discharge Outfall

The effluent is discharged from the facility via a 24-inch steel multiport diffuser outfall into the Columbia River. The outfall has three 8" diameter diffuser ports. At this location the river flows west to east south east. Leaving the plant site, the outfall follows a southerly line defined by Gray Street continuing approximately 900 feet offshore from the north bank and at a depth of approximately 30 feet.

Solid Wastes

The treatment facilities remove solids during the treatment of the wastewater at the headworks (grit and screenings), and at the primary and secondary clarifiers (biosolids). In addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment, Scum is routed to the anaerobic digester for biological oxidation.

Biosolids removed from the clarifiers are thickened (dissolved air floatation), anaerobically digested, dried in the drying beds and land applied under a permit issued by Ecology's Waste 2 Resources Program. The biosolids produced at the treatment works are of exceptional quality and beneficial use options are available. Grit, rags, and screenings are drained and disposed of as solid waste at the local landfill. The proposed permit includes a condition requiring the City to properly handle residual solids so that no leachate enters ground or surface water.

B. Permit Status

Ecology issued the previous permit for this facility on July 7, 2004. The previous permit placed effluent limitations on 5-day Biochemical Oxygen Demand (BOD_5), Total Suspended Solids (TSS), pH, and Fecal Coliform Bacteria.

The City of Pasco submitted an application for permit renewal on January 5, 2009. Ecology accepted it as complete on January 30, 2009.

C. Summary of Compliance with Previous Permit Issued

Ecology staff last conducted a non-sampling compliance inspection on June 12, 2008. The City of Pasco WWTP has complied with the effluent limits and permit conditions throughout the duration of the permit issued on July 7, 2004**.** Ecology assessed compliance based on its review of the facility's discharge monitoring reports (DMRs) and on inspections conducted by Ecology.

D. Wastewater Characterization

The concentration of pollutants in the discharge was reported in the NPDES application and in discharge monitoring reports (DMRs). The tabulated data represents the quality of the effluent discharged from the Pasco WWTP using DMR data from January 2005 through March 2009. The effluent is characterized as follows:

Table 2: Wastewater Characterization

Parameter	Average Concentration	Maximum Concentration	Minimum Concentration
Flow, MGD	3.23	3.62	3.01
Influent BOD_5, mg/L	237.3	313	191
Influent TSS, mg/L	246	327	203
Effluent BOD_5, mg/L	12.5	57	4
Effluent TSS, mg/L	15.7	100	6
Effluent NH_3, mg/L	13.6	35.1	0.41
Effluent Temperature, January, deg F	59	60	58
Effluent Temperature, August, deg F	78	79	77

E. Description of the Receiving Water

The City of Pasco WWTP discharges to the Columbia River. Other nearby point source outfalls include the City of Kennewick WWTP and the City of Richland WWTP.

The ambient background data used for this permit includes the following from environmental Assessment Program monitoring station 36A070 on the Columbia River near Vernita:

Table 3: Ambient Background Data

Parameter	Value used
Temperature (highest annual 1-DADMax)	21 ^{o} C
Temperature (**some waterbodies have specific temperature criteria as assigned in Table 602)	See Footnote 1
pH (Maximum / Minimum)	8.45/8.03
Dissolved Oxygen (Maximum / Minimum)	14.08/9.38 mg/L
Total Ammonia-N	0.01 mg/L
Fecal Coliform (Maximum)	11/100 mL
Turbidity	1.2 NTU
Hardness	65 mg/L as CaCO3
Lead	0.1 µg/L
Copper	0.67 µg/L
Zinc	5 µg/L

Footnote:

1. From Washington-Oregon border (river mile 309.3) to Priest Rapids Dam (river mile 397.1). Temperature shall not exceed a 1-DMax of 20.0°C due to human activities. When natural conditions exceed a 1-DMax of 20.0°C, no temperature increase will be allowed which will raise the receiving water temperature by greater than 0.3°C; nor shall such temperature increases, at any time, exceed t = 34/(T + 9)

F. SEPA Compliance

Regulation exempts reissuance or modification of any wastewater discharge permit from the SEPA process as long as the permit contains conditions that are no less stringent than state rules and regulations. The exemption applies only to existing discharges, not to new discharges.

The City prepared SEPA and State Environmental Review Process (SERP) documents during the planning phase of the wastewater treatment works upgrade completed in July 1998. The City prepared SERP documents to comply with Washington Water Pollution Control Revolving Fund requirements.

III. PROPOSED PERMIT LIMITS

Federal and state regulations require that effluent limits in an NPDES permit must be either technology- or water quality-based.

- Technology-based limits are based upon the treatment methods available to treat specific pollutants. Technology-based limits are set by the EPA and published as a regulation, or Ecology develops the limit on a case-by-case basis (40 CFR 125.3, and chapter 173-220 WAC).
- Water quality-based limits are calculated so that the effluent will comply with the Surface Water Quality Standards (chapter 173-201A WAC), Ground Water Standards (chapter 173-200 WAC), Sediment Quality Standards (chapter 173-204 WAC) or the National Toxics Rule (40 CFR 131.36).
- Ecology must apply the most stringent of these limits to each parameter of concern. These limits are described below.

The limits in this permit reflect information received in the application and from supporting reports (engineering, hydrogeology, etc.). Ecology evaluated the permit application and determined the limits needed to comply with the rules adopted by the state of Washington. Ecology does not develop effluent limits for all reported pollutants**.** Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation.

Nor does Ecology usually develop limits for pollutants that were not reported in the permit application but that may be present in the discharge. The permit does not authorize discharge of the non-reported pollutants. If significant changes occur in any constituent of the effluent discharge, the City of Pasco is required to notify Ecology (40 CFR 122.42(a)). The City of Pasco may be in violation of the permit until Ecology modifies the permit to reflect additional discharge of pollutants.

G. Design Criteria

In accordance with WAC 173-220-150 (1)(g), flows or waste loadings must not exceed approved design criteria. However Ecology-is requiring an update of the design criteria to reflect recent upgrades of the solids handling treatment train which limiting hydraulic capacity and organic loading capacity.

Table 4: Design Criteria for the City of Pasco WWTP

Influent Loadings in the Design Criteria	Year
Population	To be determined (TBD)
Average Annual Flow (MGD)	TBD
Maximum Month Flow (MGD)	TBD

Influent Loadings in the Design Criteria	Year
Maximum Day Flow (MGD)	TBD
Maximum Hour Flow (MGD)	TBD
BOD_5 Loading– Average Annual (lbs/day)	TBD
BOD_5 Loading – Maximum Month (lbs/day)	TBD
TSS Loading – Average Annual (lbs/day)	TBD
TSS Loading– Maximum Month (lbs/day)	TBD
Ammonia Loading – Average Annual (lbs/day)	TBD
Ammonia Loading – Maximum Month (1,000 lbs/day)	TBD

H. Technology-Based Effluent Limits

Federal and state regulations define technology-based effluent limits for municipal wastewater treatment plants. These effluent limits are given in 40 CFR Part 133 (federal) and in chapter 173-221 WAC (state). These regulations are performance standards that constitute all known, available, and reasonable methods of prevention, control, and treatment (AKART) for municipal wastewater.

Chapter 173-221 WAC lists the following technology-based limits for pH, fecal coliform, BOD_5, and TSS:

Table 5: Technology-based Limits

Parameter	Limit
pH	The pH must measure within the range of 6.0 to 9.0 standard units.
Fecal Coliform Bacteria	Monthly Geometric Mean = 200 organisms/100 mL Weekly Geometric Mean = 400 organisms/100 mL
BOD_5 (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L
TSS (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L

The technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b). From the previous permit the effluent mass was as follows and will be used temporarily until the required engineering report is approved.

The maximum month effluent mass (lbs/day) was calculated as the maximum monthly design flow (4.52 MGD) x Concentration limit (30 mg/L) x 8.34 (conversion factor) = mass limitation of 1131 lb./day of BOD_5 or TSS.

Monthly effluent mass loadings (lbs/day) = maximum monthly influent design loading (10,690 lbs./day) x 0.15 = 1603.5 lbs./day, BOD5 or . (8,720 lbs./day) x 0.15 = 1308 lbs./day TSS

The weekly average effluent mass loading = 1.5 x monthly loading.
1.5 x 1603.5 lbs./day =2405 lbs/day BOD5 or 1.5 x 1308 lbs/day = 1962 lbs/day TSS

The calculation of mass based on flow x concentration x conversion faction above generates the more restrictive effluent mass limit.

I. Surface Water Quality-Based Effluent Limits

The Washington State Surface Water Quality Standards (chapter 173-201A WAC) are designed to protect existing water quality and preserve the beneficial uses of Washington's surface waters. Waste discharge permits must include conditions that ensure the discharge will meet the surface water quality standards (WAC 173-201A-510). Water quality-based effluent limits may be based on an individual waste load allocation or on a waste load allocation developed during a basin wide total maximum daily load study (TMDL).

Numerical Criteria for the Protection of Aquatic Life and Recreation

Numerical water quality criteria are listed in the water quality standards for surface waters (chapter 173-201A WAC). They specify the maximum levels of pollutants allowed in receiving water to protect aquatic life and recreation in and on the water. Ecology uses numerical criteria along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality based limits are more stringent or potentially more stringent than technology based limits, the discharge must meet the water quality based limits.

Numerical Criteria for the Protection of Human Health

The U.S. EPA has published 91 numeric water quality criteria for the protection of human health that are applicable to dischargers in Washington State (EPA 1992). These criteria are designed to protect humans from exposure to pollutants linked to cancer and other disease, based on consuming fish and shellfish and drinking contaminated surface waters. The water quality standards also include radionuclide criteria to protect humans from the effects of radioactive substances.

Narrative Criteria

Narrative water quality criteria (e.g., WAC 173-201A-240(1); 2006) limit the toxic, radioactive, or other deleterious material concentrations that the facility may discharge to levels below those which have the potential to:

- Adversely affect designated water uses.
- Cause acute or chronic toxicity to biota.
- Impair aesthetic values.
- Adversely affect human health.

Narrative criteria protect the specific designated uses of all fresh waters (WAC 173-201A-200, 2006) and of all marine waters (WAC 173-201A-210,; 2006) in the State of Washington.

Antidegradation

The purpose of Washington's Antidegradation Policy (WAC 173-201A-300-330; 2006) is to:

- Restore and maintain the highest possible quality of the surface waters of Washington.
- Describe situations under which water quality may be lowered from its current condition.
- Apply to human activities that are likely to have an impact on the water quality of surface water.
- Ensure that all human activities likely to contribute to a lowering of water quality, at a minimum, apply all known, available, and reasonable methods of prevention, control, and treatment (AKART).
- Apply three tiers of protection (described below) for surface waters of the state.

Tier I ensures existing and designated uses are maintained and protected and applies to all waters and all sources of pollutions. Tier II ensures that waters of a higher quality than the criteria assigned are not degraded unless such lowering of water quality is necessary and in the overriding public interest. Tier II applies only to a specific list of polluting activities. Tier III prevents the degradation of waters formally listed as "outstanding resource waters," and applies to all sources of pollution.

A facility must prepare a Tier II analysis when all three of the following conditions are met:

- The facility is planning a new or expanded action.
- Ecology regulates or authorizes the action.

- The action has the potential to cause measurable degradation to existing water quality at the edge of a chronic mixing zone.

This facility must meet Tier I requirements.

- Dischargers must maintain and protect existing and designated uses. Ecology must not allow any degradation that will interfere with, or become injurious to, existing or designated uses, except as provided for in chapter 173-201A WAC.
- The facility must include a Tier II analysis in the engineering report demonstrating that accommodating an additional 20 years of capacity will not cause measurable degradation to existing water quality at the edge of a chronic mixing zone.

Mixing Zones

A mixing zone is the defined area in the receiving water surrounding the discharge port(s), where wastewater mixes with receiving water. Within mixing zones the pollutant concentrations may exceed water quality numeric standards, so long as the discharge does not interfere with designated uses of the receiving water body (for example, recreation, water supply, and aquatic life and wildlife habitat, etc.) The pollutant concentrations outside of the mixing zones must meet water quality numeric standards.
State and federal rules allow mixing zones because the concentrations and effects of most pollutants diminish rapidly after discharge, due to dilution. Ecology defines mixing zone sizes to limit the amount of time any exposure to the end-of-pipe discharge could harm water quality, plants, or fish.

The state's water quality standards allow Ecology to authorize mixing zones for the facility's permitted wastewater discharges only if those discharges already receive all known, available, and reasonable methods of prevention, control, and treatment (AKART). Mixing zones typically require compliance with water quality criteria within a specified distance from the point of discharge and use no more than 25% of the available width of the water body for dilution. Ecology uses modeling to estimate the amount of mixing within the mixing zone. Through modeling, Ecology determines the potential for violating the water quality standards at the edge of the mixing zone and derive any necessary effluent limits. Steady state models are the most frequently used tools for conducting mixing zone analyses. Ecology chooses values for each effluent and for receiving water variables that correspond to the time period when the most critical condition is likely to occur (see Ecology's *Permit Writer's Manual*). Each critical condition parameter, by itself, has a low probability of occurrence and the resulting dilution factor is conservative. The term "reasonable worst-case" applies to these values.

The mixing zone analysis produces a numerical value called a dilution factor (DF). A dilution factor represents the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. For example, a dilution factor of 10 means the effluent is 10% and the receiving water is 90% of the total volume of water at the boundary of the mixing zone. Ecology uses dilution factors with the water quality criteria to calculate reasonable potentials and effluent limits.

Water quality standards include both aquatic life-based criteria and human health-based criteria. The former are applied at both the acute and chronic mixing zone boundaries; the latter are applied only at the chronic boundary. The concentration of pollutants at the boundaries of any of these mixing zones may not exceed the numerical criteria for that zone.

Each aquatic life **acute** criterion is based on the assumption that organisms are not exposed to that concentration for more than one hour and more often than one exposure in three years.
Each aquatic life **chronic** criterion is based on the assumption that organisms are not exposed to that concentration for more than four consecutive days and more often than once in three years.

The two types of human health-based water quality criteria distinguish between those pollutants linked to non-cancer effects (non-carcinogenic) and those linked to cancer effects (carcinogenic). The human health-based water quality criteria incorporate several exposure and risk assumptions. These assumptions include:

- A 70-year lifetime of daily exposures.
- An ingestion rate for fish or shellfish measured in kg/day.
- An ingestion rate of two liters/day for drinking water
- A one-in-one-million cancer risk for carcinogenic chemicals.

This permit authorizes a small acute mixing zone, surrounded by a chronic mixing zone around the point of discharge (WAC 173-201A-400). The water quality standards impose certain conditions before allowing the discharger a mixing zone:

1. Ecology must specify both the allowed size and location in a permit.

The mixing zones will accommodate the geometric configuration and flow restriction for mixing zones in Chapter 173-201A WAC and are defined as follows:

The chronic mixing zone shall extend no more than 330 feet downstream from the point of discharge and the acute mixing zone shall extend no more than 33 feet downstream.

Ecology used the mixing zone dilution using as-built record drawing information for the new outfall, the defined mixing zone geometry and the CORMIX model to verify that the outfall provides adequate dilution to ensure that the discharge meets water quality standards. Ecology determined the following dilution factors using CORMIX in preparation for issuing the 1999 NPDES permit.

Temperature scenario	Acute mixing zone dilution	Chronic mixing zone dilution	
Summer	1:150	1:182	effluent:river
Winter	1:139	1:173	effluent:river

Ecology used the following critical conditions to model the discharge:

- The seven-day-average low river flow with a recurrence interval of ten years (7Q10); was 38,000 cfs when the outfall was designed and modeled.

Parameter	Value	Value
Velocity	0.17 m/s	0.17 m/s
Depth	9.1 m	9.1 m
Width	915 m	915 m
Roughness (Manning)	0.025	0.025
Temperature	4 C	21 C
Copper (August 2002 result)	35 ug/L in effluent	35 ug/L in effluent

Before reissuing the NPDES permit in 2004 Ecology rechecked dilution using Visual Plumes and modeled the discharge from each diffuser ports separately. The plumes are separate and distinct within the allowed mixing zone, particularly in winter. In summer, when the effluent is slightly more buoyant than the receiving water, the plumes begin to merge at the edge of the chronic mixing zone. However, the dilution at the edge of the chronic mixing zone as calculated by Visual Plumes is 649.8. Using Visual Plumes the dilution at the edge of the acute mixing zone is 27.9.

No changes have occurred generating new input parameters. Therefore, Ecology has used the mixing analysis completed for the 2004 permit for this proposed permit.

2. The facility must fully apply “all known, available, and reasonable methods of prevention, control and treatment” (AKART) to its discharge.

Ecology has determined that the treatment provided at the Pasco WWTP meets the requirements of AKART (see “Technology based Limits”).

3. Ecology must consider critical discharge conditions.

Surface water quality-based limits are derived for the waterbody’s critical condition (the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or designated waterbody uses). The critical discharge condition is often pollutant-specific or waterbody-specific.

Critical discharge conditions are those conditions that result in reduced dilution or increased effect of the pollutant. Factors affecting dilution include the depth of water, the density stratification in the water column, the currents, and the rate of discharge. Density stratification is determined by the salinity and temperature of the receiving water. Temperatures are warmer in the surface waters in summer. Therefore, density stratification is generally greatest during the summer months. Density stratification affects how far up in the water column a freshwater plume may rise.

The rate of mixing is greatest when an effluent is rising. The effluent stops rising when the mixed effluent is the same density as the surrounding water. After the effluent stops rising, the rate of mixing is much more gradual. Water depth can affect dilution when a plume might rise to the surface when there is little or no stratification. Ecology's *Permit Writer's Manual* describes additional guidance on criteria/design conditions for determining dilution factors. The manual can be obtained from Ecology's website at http://www.ecy.wa.gov/biblio/92109.html.

4. **Supporting information must clearly indicate the mixing zone would not:**
   - **Have a reasonable potential to cause the loss of sensitive or important habitat.**
   - **Substantially interfere with the existing or characteristic uses.**
   - **Result in damage to the ecosystem.**
   - **Adversely affect public health.**

Ecology established Washington State water quality criteria for toxic chemicals using EPA criteria. EPA developed the criteria using toxicity tests with numerous organisms and set the criteria to generally protect the species tested and to fully protect all commercially and recreationally important species.

EPA sets acute criteria for toxic chemicals assuming organisms are exposed to the pollutant at the criteria concentration for one hour. They set chronic standards assuming organisms are exposed to the pollutant at the criteria concentration for four days. Dilution modeling under critical conditions generally shows that both acute and chronic criteria concentrations are reached within minutes of being discharged.

The discharge plume does not impact drifting and non-strong swimming organisms because they cannot stay in the plume close to the outfall long enough to be affected. Strong swimming fish could maintain a position within the plume, but they can also avoid the discharge by swimming away. Mixing zones generally do not affect benthic organisms (bottom dwellers) because the buoyant plume rises in the water column. Ecology has additionally determined that the effluent will not exceed 33 degrees C for more than two seconds after discharge; and that the temperature of the water will not create lethal conditions or blockages to fish migration.

Ecology evaluates the cumulative toxicity of an effluent by testing the discharge with whole effluent toxicity (WET) testing.

Ecology reviewed the above information, the specific information on the characteristics of the discharge, the receiving water characteristics and the discharge location. Based on this review, Ecology concluded that the discharge does not have a reasonable potential to cause the loss of sensitive or important habitat, substantially interfere with existing or characteristics uses, result in damage to the ecosystem, or adversely affect public health if the permit limits are met.

5. The discharge/receiving water mixture must not exceed water quality criteria outside the boundary of a mixing zone.

Ecology conducted a reasonable potential analysis using procedures established by the EPA and by Ecology for each pollutant and concluded that the discharge/receiving water mixture will not violate water quality criteria outside the boundary of the mixing zone if permit limits are met.

6. The size of the mixing zone and the concentrations of the pollutants must be minimized.

At any given time, the effluent plume uses only a portion of the acute and chronic mixing zone, which minimizes the volume of water involved in mixing. The plume may rise through the water column as it mixes depending on the temperature, therefore much of the receiving water volume at lower depths in the mixing zone may not be mixed with discharge. Similarly, because the discharge may stop rising at some depth due to density stratification, waters above that depth will not mix with the discharge. Ecology determined it is impractical to specify in the permit the actual, much more limited volume in which the dilution occurs as the plume rises and moves with the current.

Ecology minimizes the size of mixing zones by requiring dischargers to install diffusers when they are appropriate to the discharge and the specific receiving waterbody. Pasco has a multi-port diffuser, 3 ports. When a diffuser is installed, the discharge is more completely mixed with the receiving water in a shorter time.
Ecology also minimizes the size of the mixing zone (in the form of the dilution factor) using design criteria with a low probability of occurrence. For example, Ecology uses the expected 95th percentile pollutant concentration, the 90th percentile background concentration, the centerline dilution factor, and the lowest flow occurring once in every ten years to perform the reasonable potential analysis.

Because of the above reasons, Ecology has effectively minimized the size of the mixing zone authorized in the proposed permit.

7. Maximum size of mixing zone.

The authorized mixing zone does not exceed the maximum size restriction.

8. Acute mixing zone.

- **The discharge/receiving water mixture must comply with acute criteria as near to the point of discharge as practicably attainable.**

  Ecology determined that the acute criteria will be met at 10% of the distance or of the chronic mixing zone at the ten year low flow.

- **The pollutant concentration, duration, and frequency of exposure to the discharge will not create a barrier to migration or translocation of indigenous organisms to a degree that has the potential to cause damage to the ecosystem.**

  As described above, the toxicity of any pollutant depends upon the exposure, the pollutant concentration, and the time the organism is exposed to that concentration. Authorizing a limited acute mixing zone for this discharge assures that it will not create a barrier to migration. The effluent from this discharge will rise as it enters the receiving water, assuring that the rising effluent will not cause translocation of indigenous organisms near the point of discharge (below the rising effluent).

- **Comply with size restrictions.**

  The mixing zone authorized for this discharge complies with the size restrictions published in chapter 173-201A WAC.

9. Overlap of Mixing Zones.

This mixing zone does not overlap another mixing zone.

J. Designated Uses and Surface Water Quality Criteria

Applicable designated uses and surface water quality criteria are defined in chapter 173-201A WAC. In addition, the U.S. EPA set human health criteria for toxic pollutants (EPA 1992). Criteria applicable to this facility's discharge are summarized below in Table 6.

- Aquatic Life Uses are designated based on the presence of, or the intent to provide protection for, the key uses. All indigenous fish and non-fish aquatic species must be protected in waters of the state in addition to the key species. The Aquatic Life Uses for this receiving water are identified below.

Table 6: Aquatic Life Uses & Associated Criteria

Salmonid Rearing and Migration Only	
Temperature Criteria – Highest 7DAD MAX	From the Washington-Oregon border (river mile 309.3) to Priest Rapids Dam (river mile 397.1) temperature shall not exceed a 1-DMax of 20.0°C due to human activities. When natural conditions exceed a 1-DMax of 20.0°C, no temperature increase will be allowed which will raise the receiving water temperature by greater than 0.3°C; nor shall such temperature increases, at any time, exceed t = 34/(T + 9).
Dissolved Oxygen Criteria – Lowest 1-Day Minimum	6.5 mg/L
Turbidity Criteria	• 10 NTU over background when the background is 50 NTU or less; or • A 20 percent increase in turbidity when the

	background turbidity is more than 50 NTU
Total Dissolved Gas Criteria	Total dissolved gas shall not exceed 110 percent of saturation at any point of sample collection
pH Criteria	pH shall be within the range of 6.5 to 8.5 with a human-caused variation within the above range of less than 0.5 units

- The recreational uses are extraordinary primary contact recreation, primary contact recreation, and secondary contact recreation. The recreational uses for this receiving water are identified below.

Table 7: Recreational Uses and Associated Criteria

Recreational Use	Criteria
Primary Contact Recreation	Fecal coliform organism levels must not exceed a geometric mean value of 100 colonies/100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 200 colonies/100 mL

- The **water supply uses** are domestic, agricultural, industrial, and stock watering.
- The **miscellaneous freshwater use**s are wildlife habitat, harvesting, commerce and navigation, boating, and aesthetics.

K. Evaluation of Surface Water Quality-Based Effluent Limits for Numeric Criteria

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near-field) or at a considerable distance from the point of discharge (far-field). Toxic pollutants, for example, are near-field pollutants—their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as biological oxygen demand (BOD) is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating surface water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

With technology-based controls (AKART), predicted pollutant concentrations in the discharge exceed water quality criteria. Ecology therefore authorizes a mixing zone in accordance with the geometric configuration, flow restriction, and other restrictions imposed on mixing zones by chapter 173-201A WAC.

Chronic Mixing Zone

WAC 173-201A-400(7)(a) specifies that mixing zones must not extend in a downstream direction from the discharge ports for a distance greater than 300 feet plus the depth of water over the discharge ports or extend upstream for a distance of over 100 feet, not utilize greater than **25%** of the flow, and not occupy greater than **25%** of the width of the water body.

The maximum boundaries of the mixing zones are defined as follows: The chronic mixing zone shall extend no more than 330 feet downstream from the point of discharge. The acute mixing zone shall extend no more than 33 feet downstream of the point of discharge.

Acute Mixing Zone

WAC 173-201A-400(8)(a) specifies that in rivers and streams a zone where acute toxics criteria may be exceeded must not extend beyond 10% of the distance towards the upstream and downstream boundaries of the chronic zone, not use greater than **2.5%** of the flow and not occupy greater than **25%** of the width of the water body.

Ecology determined the dilution factors that occur within these zones at the critical condition using the reasonable potential spreadsheet. The dilution factors are listed in Table 7. The dilution factors below use a 7Q10 from the most recent recorded data from USGS; the current 7Q10 flow is 61,200 cfs.

Table 8: Dilution Factors (DF)

Criteria	Acute	Chronic
Aquatic Life	1:181	1:2198
Human Health, Carcinogen		1:8477
Human Health, Non-carcinogen		1:3077

Ecology determined the impacts of temperature, pH, ammonia, and copper as described below, using the dilution factors in the above table. The derivation of surface water quality-based limits also takes into account the variability of pollutant concentrations in both the effluent and the receiving water.

BOD_5--With technology-based limits, this discharge results in a small amount of BOD loading relative to the large amount of dilution in the receiving water at critical conditions. Technology-based limits will ensure that dissolved oxygen criteria are met in the receiving water.

Temperature--The state temperature standards (WAC 173-201A-200-210 and 600-612) include multiple elements:

- Annual summer maximum threshold criteria (June 15 to September 15)
- Supplemental spawning and rearing season criteria (September 15 to June 15)
- Incremental warming restrictions
- Protections against acute effects

Ecology evaluates each criterion independently to determine reasonable potential and derive permit limits.

- Annual summer maximum and supplementary spawning/rearing criteria

Each water body has an annual maximum temperature criterion [WAC 173-201A-200(1)(c), 210(1)(c), and Table 602]. These threshold criteria (e.g., 12, 16, 17.5, 20°C) protect specific categories of aquatic life by controlling the effect of human actions on summer temperatures.

Some waters have an additional threshold criterion to protect the spawning and incubation of salmonids (9°C for char and 13°C for salmon and trout) [WAC 173-201A-602, Table 602]. These criteria apply during specific date-windows.

The threshold criteria apply at the edge of the chronic mixing zone. Criteria for most fresh waters are expressed as the highest 7-Day average of daily maximum temperature (7-DADMax).

The 7-DADMax temperature is the arithmetic average of seven consecutive measures of daily maximum temperatures. Criteria for marine waters and some fresh waters are expressed as the highest 1-Day annual maximum temperature (1-DMax).

- Incremental warming criteria

The water quality standards limit the amount of warming human sources can cause under specific situations [WAC 173-201A-200(1)(c)(i)-(ii), 210(1)(c)(i)-(ii)]. The incremental warming criteria apply at the edge of the chronic mixing zone.

At locations and times when background temperatures are cooler than the assigned threshold criterion, point sources are permitted to warm the water by only a defined increment.

These increments are permitted only to the extent doing so does not cause temperatures to exceed either the annual maximum or supplemental spawning criteria.

At locations and times when a threshold criterion is being exceeded due to natural conditions, all human sources, considered cumulatively, must not warm the water more than 0.3°C above the naturally warm condition.

When Ecology has not yet completed a TMDL, our policy allows each point source to warm water at the edge of the chronic mixing zone by 0.3°C. This is true regardless of the background temperature and even if doing so would cause the temperature at the edge of a standard mixing zone to exceed the numeric threshold criteria. Allowing a 0.3°C warming for each point source is reasonable and protective where the dilution factor is based on 25% or less of the critical flow. This is because the fully mixed effect on temperature will only be a fraction of the 0.3°C cumulative allowance (0.075°C or less) for all human sources combined.

- Temperature Acute Effects

  Instantaneous lethality to passing fish: The upper 99th percentile daily maximum effluent temperature must not exceed 33°C; unless a dilution analysis indicates ambient temperatures will not exceed 33°C 2-seconds after discharge.

  General lethality and migration blockage: Measurable (0.3°C) increases in temperature at the edge of a chronic mixing zone are not allowed when the receiving water temperature exceeds either a 1DMax of 23°C or a 7DADMax of 22°C.

  Lethality to incubating fish: Human actions must not cause a measurable (0.3°C) warming above 17.5°C at locations where eggs are incubating.

Annual summer maximum, supplementary spawning criterion, and incremental warming criteria: Ecology calculated the reasonable potential for the discharge to exceed the annual summer maximum, the supplementary spawning criterion, and the incremental warming criteria at the edge of the chronic mixing zone during critical condition(s). Reasonable potential for temperature was checked for early summer when a higher difference between effluent temperature and river temperature was noted. The incremental increase was marginally greater in June and both June and August (critical condition) had incremental increase much less than the criteria. The incremental increase (0.04 C) for this discharge is within the allowable amount. Therefore, the proposed permit does not include a temperature limit.

The proposed permit will require monitoring of effluent and influent temperatures. USGS data supplies the ambient temperature.

pH--Ecology predicts no violation of the pH criteria under critical conditions. Therefore, the proposed permit includes technology-based effluent limits for pH.

Fecal Coliform--Under critical conditions, modeling predicts no violation of the water quality criterion for fecal coliform. Therefore, the proposed permit includes the technology-based effluent limit for fecal coliform bacteria.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require Ecology to place limits in NPDES permits on toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. Ecology does not exempt facilities with technology-based effluent limits from meeting the surface water quality standards.

The following toxic pollutants are present in the discharge: ammonia, and heavy metals.

Valid ambient background data was available for ammonia and copper. Ecology used all applicable data to evaluate reasonable potential for this discharge to cause a violation of water quality standards.

Ecology determined that ammonia and copper pose no reasonable potential to exceed the water quality criteria at the critical condition using procedures given in EPA, 1991 and as described above. Ecology's determination assumes that this facility meets the other effluent limits of this permit.

L. Whole Effluent Toxicity

The water quality standards for surface waters forbid discharge of effluent that causes toxic effects in the receiving waters. Many toxic pollutants cannot be measured by commonly available detection methods. However, laboratory tests can measure toxicity directly by exposing living organisms to the wastewater and measuring their responses. These tests measure the aggregate toxicity of the whole effluent, so this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

WET testing conducted during effluent characterization showed no reasonable potential for effluent discharges to cause receiving water **acute** toxicity. The proposed permit will not impose an acute WET limit.

If this facility makes process or material changes which, in Ecology's opinion, increase the potential for effluent toxicity, then Ecology may (in a regulatory order, by permit modification, or in the permit renewal) require the facility to conduct additional effluent characterization.

WET testing conducted during effluent characterization showed no reasonable potential for the effluent to cause receiving water **chronic** toxicity. The proposed permit will not impose a chronic WET limit.

- If this facility makes process or material changes which, in Ecology's opinion, increase the potential for effluent toxicity, then Ecology may (in a regulatory order, by permit modification, or in the permit renewal) require the facility to conduct additional effluent characterization.

M. Human Health

Washington's water quality standards include 91 numeric human health-based criteria that Ecology must consider when writing NPDES permits. These criteria were established in 1992 by the U.S. EPA in its National Toxics Rule (40 CFR 131.36). The National Toxics Rule allows states to use mixing zones to evaluate whether discharges comply with human health criteria.

Ecology determined the applicant's discharge does not contain chemicals of concern based on existing effluent data or knowledge of discharges to their system. Ecology will reevaluate this discharge for impacts to human health at the next permit reissuance.

N. Sediment Quality

The aquatic sediment standards (chapter 173-204 WAC) protect aquatic biota and human health. Under these standards Ecology may require a facility to evaluate the potential for its discharge to cause a violation of sediment standards (WAC 173-204-400). You can obtain additional information about sediments at the Aquatic Lands Cleanup Unit website at http://www.ecy.wa.gov/programs/tcp/smu/sediment.html .

Through a review of the discharger characteristics and of the effluent characteristics, Ecology determined that this discharge has no reasonable potential to violate the sediment management standards.

O. Ground Water Quality Limits

The ground water quality standards (chapter 173-200 WAC) protect beneficial uses of ground water. Permits issued by Ecology must not allow violations of those standards (WAC 173-200-100).

The City of Pasco Wastewater Treatment Plant does not discharge wastewater to the ground. No permit limits are required to protect ground water.

P. Comparison of Effluent Limits with the Previous Permit Issued on July 7, 2004

Table 9: Comparison of Effluent Limits

	Basis of Limit	**Previous Effluent Limits: Outfall # 001**		**Proposed Effluent Limits: Outfall # 001**	
		Average Monthly	**Average Weekly**	**Average Monthly**	**Average Weekly**
Biochemical Oxygen Demand (5-day)	Technology	30 mg/L	45 mg/L	30 mg/L	45 mg/L
Total Suspended Solids	Technology	30 mg/L	45 mg/L	30 mg/L	45 mg/L
Fecal Coliform Bacteria	Technology	200/100 mL	400/100 mL	200/100 mL	400/100 mL
pH	Technology	6.0 to 9.0		6.0 to 9.0	
Parameter		**Average Monthly**	**Maximum Daily**	**Average Monthly**	**Maximum Daily**
pH	Technology		9.0		9.0

IV. MONITORING REQUIREMENTS

Ecology requires monitoring, recording, and reporting (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and that the discharge complies with the permit's effluent limits.

The monitoring schedule is detailed in the proposed permit under Condition S.2. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is consistent with agency guidance given in the current version of Ecology's *Permit Writer's Manual* (Publication Number 92-09) for a municipal wastewater treatment plant using the activated sludge process and having an annual average flow of between 2 and 5 MGD. Ecology's *Permit Writer's Manual* also recommends that WWTP with flow over 1.0 MGD or having a pretreatment program monitor for phenols, cyanide, volatile organic compounds, base-neutral compounds and acid-extractable compounds.

Monitoring of sludge quantity and quality is necessary to determine the appropriate uses of the sludge. Biosolids monitoring is required by the current state and local solid waste management program and also by EPA under 40 CFR 503.

As a pretreatment publicly owned treatment works (POTW), the City of Pasco is required to sample influent, primary clarifier effluent, final effluent, and sludge for toxic pollutants in order to characterize the industrial input. Sampling is also done to determine if pollutants interfere with the treatment process or pass-through the plant to the sludge or the receiving water. The City of Pasco will use the monitoring data to develop local limits which commercial and industrial users must meet.

Q. Lab Accreditation

Ecology requires that facilities must use a laboratory registered or accredited under the provisions of chapter 173-50 WAC, *Accreditation of Environmental Laboratories* to prepare all monitoring data (with the exception of certain parameters). Ecology accredited the laboratory at this facility for the following parameters:

General Chemistry			
parameter name	**method**	**reference**	**matrix** *
Alkalinity, Total	2320 B	SM	N
Ammonia	4500-NH3 D	SM 19/20	N
Biochemical Oxygen Demand, BOD/CBOD	5210 B	SM	N
Chlorine Residual, Total	4500-Cl G	SM	N
Dissolved Oxygen	4500-O G	SM	N
Nitrate	10020	Hach	N
pH	4500-H	SM	N
Solids, Total Suspended	2540 D	SM	N
Specific Conductance	2510 B	SM	N
Microbiology			

parameter name	method	reference	matrix *
Fecal Coliform - count	9222 D	SM	N
* Matrix key: D = drinking water; N = non-potable water; S = solids/chem materials; A = air			

V. OTHER PERMIT CONDITIONS

R. Reporting and Record Keeping

Ecology based permit condition S3 on our authority to specify any appropriate reporting and record keeping requirements to prevent and control waste discharges (WAC 173-220-210).

S. Prevention of Facility Overloading

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the City of Pasco to take the actions detailed in proposed permit requirement S.4 to plan expansions or modifications before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants. Condition S.4 restricts the amount of flow.

The City of Pasco did exceed 85% of the design maximum month in October, November and December 2008. This likely is due to infiltration. Historically the highest flows of the year are in the fall of the year. In August 2005, the City requested a capacity analysis of the various components. The trickling filter is the limiting unit process. However, the trickling filter is used as a roughing filter and is not a limiting critical unit. The next limiting process unit at the time of the report was the anaerobic digester. The solids portion of the plant was upgraded last year and the solids portion of the plant is now unlikely to be the limiting factor. It is not clear what the current capacity and design criteria is.

The proposed permit will require an evaluation of the hydraulic and organic loading capacity of the City of Pasco's wastewater facilities as they currently exist and if necessary make recommendations appropriate for the City's wastewater facilities to provide twenty years of additional service to the community.

T. Operation and Maintenance (O&M)

The proposed permit contains Condition S.5 as authorized under RCW 90.48.110, WAC 173-220-150, chapter 173-230 WAC, and WAC 173-240-080. Ecology included it to ensure proper operation and regular maintenance of equipment, and to ensure that the City of Pasco Wastewater Treatment Plant takes adequate safeguards so that it uses the constructed facilities to their optimum potential in terms of pollutant capture and treatment.

U. Pretreatment

Duty to Enforce Discharge Prohibitions

This provision prohibits the publicly owned treatment works (POTW) from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer.

- The first section of the pretreatment requirements prohibits the POTW from accepting pollutants which causes "Pass-through" or "Interference". This general prohibition is from 40 CFR §403.5(a). Appendix B of this fact sheet defines these terms.

- The second section reinforces a number of specific State and Federal pretreatment prohibitions found in WAC 173-216-060 and 40 CFR §403.5(b). These reinforce that the POTW may not accept certain wastes, which:
  - Are prohibited due to dangerous waste rules.
  - Are explosive or flammable.
  - Have too high or low of a pH (too corrosive, acidic or basic).
  - May cause a blockage such as grease, sand, rocks, or viscous materials.
  - Are hot enough to cause a problem.
  - Are of sufficient strength or volume to interfere with treatment.
  - Contain too much petroleum-based oils, mineral oil, or cutting fluid.
  - Create noxious or toxic gases at any point.

  40 CFR Part 403 contains the regulatory basis for these prohibitions, with the exception of the pH provisions which are based on WAC 173-216-060.

- The third section of pretreatment conditions reflects state prohibitions on the POTW accepting certain types of discharges unless the discharge has received prior written authorization from Ecology. These discharges include:
  - Cooling water in significant volumes.
  - Stormwater and other direct inflow sources.
  - Wastewaters significantly affecting system hydraulic loading, which do not require treatment.

Federal and State Pretreatment Program Requirements

Ecology administers the Pretreatment Program under the terms of the addendum to the "Memorandum of Understanding between Washington Department of Ecology and the United States Environmental Protection Agency, Region 10" (1986) and 40 CFR, part 403. Under this delegation of authority, Ecology issues wastewater discharge permits for significant industrial users (SIUs) discharging to POTWs which have not been delegated authority to issue wastewater discharge permits. Ecology must approve, condition, or deny new discharges or a significant increase in the discharge for existing significant industrial users (SIUs) (40 CFR 403.8 (f)(1)(i) and(iii)).

Industrial dischargers must obtain a permit from Ecology before discharging waste to the City of Pasco Wastewater Treatment Plant (WAC 173-216-110(5)). Industries discharging wastewater that is similar in character to domestic wastewater do not require a permit.

Routine Identification and Reporting of Industrial Users

The permit requires non-delegated POTWs to take "continuous, routine measures to identify all existing, new, and proposed significant industrial users (SIUs) and potential significant industrial users (PSIUs)" discharging to their sewer system. Examples of such routine measures include regular review of water and sewer billing records, business license and building permit applications, advertisements, and personal reconnaissance. System maintenance personnel should be trained on what to look for so they can identify and report new industrial dischargers in the course of performing their jobs. The POTW may not allow SIUs to discharge prior to receiving a permit, and must notify all industrial dischargers (significant or not) in writing of their responsibility to apply for a State Waste Discharge Permit. The POTW must send a copy of this notification to Ecology.

Requirements for Performing an Industrial User Survey

The proposed permit is to be issued for 1 year. The requirement for an Industrial User Survey has been deleted from the proposed permit. It will be in the following permit.

V. Solid Waste Control

To prevent water quality problems the facility is required in permit Condition S7 to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and state water quality standards.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 CFR 503, and by Ecology under chapter 70.95J RCW, chapter 173-308 WAC "Biosolids Management," and chapter 173-350 WAC "Solid Waste Handling Standards." The disposal of other solid waste is under the jurisdiction of the Benton Franklin County Health District.

Requirements for monitoring sewage sludge and record keeping are included in this permit. This information will be used by Ecology to develop or update local limits and is also required under 40 CFR 503.

W. General Conditions

Ecology bases the standardized General Conditions on state and federal law and regulations. They are included in all individual municipal NPDES permits issued by Ecology.

VI. PERMIT ISSUANCE PROCEDURES

X. Permit Modifications

Ecology may modify this permit to impose numerical limits, if necessary to comply with water quality standards for surface waters, with sediment quality standards, or with water quality standards for ground waters, based on new information from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

Ecology may also modify this permit to comply with new or amended state or federal regulations.

Y. Proposed Permit Issuance

This proposed permit meets all statutory requirements for Ecology to authorize a wastewater discharge. The permit includes limits and conditions to protect human health and aquatic life, and the beneficial uses of waters of the state of Washington. Ecology proposes to issue this permit for a term of 1 year with a compliance schedule requiring submission of an engineering report suitable for approval. The engineering report must evaluate the hydraulic and organic loading capacity of the City of Pasco's wastewater facilities as they currently exist and if necessary recommend appropriate upgrade to the wastewater facilities enabling it to provide twenty years of additional service to the community. The report must also include a Tier II antidegradation analysis as described earlier in the fact sheet.

VII.REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

1992. *National Toxics Rule.* Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. *Technical Support Document for Water Quality-based Toxics Control*. EPA/505/2-90-001.

1988. *Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling.* USEPA Office of Water, Washington, D.C.

1985. *Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water*. EPA/600/6-85/002a.

1983. *Water Quality Standards Handbook.* USEPA Office of Water, Washington, D.C.

Tsivoglou, E.C., and J.R. Wallace.

1972. *Characterization of Stream Reaeration Capacity*. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

Washington State Department of Ecology.

2006. *Permit Writer's Manual.* Publication Number 92-109 (http://www.ecy.wa.gov/biblio/92109.html)

Laws and Regulations (http://www.ecy.wa.gov/laws-rules/index.html)

Permit and Wastewater Related Information (http://www.ecy.wa.gov/programs/wq/wastewater/index.html)

Water Pollution Control Federation.

1976. *Chlorination of Wastewater.*

Wright, R.M., and A.J. McDonnell.

1979. *In-stream Deoxygenation Rate Prediction.* Journal Environmental Engineering Division, ASCE. 105(EE2). (Cited in EPA 1985 op.cit.)

APPENDIX A—PUBLIC INVOLVEMENT INFORMATION

Ecology proposes to reissue a permit to the City of Pasco Wastewater Treatment Plant. The permit includes wastewater discharge limits and other conditions. This fact sheet describes the facility and Ecology's reasons for requiring permit conditions.

Ecology will place a Public Notice of Draft on May 12, 2010 in the Tri-City Herald to inform the public and to invite comment on the proposed draft National Pollutant Discharge Elimination System permit and fact sheet.

The notice –

- Tells where copies of the draft permit and fact sheet are available for public evaluation.
- Offers to provide the documents in an alternate format to accommodate special needs.
- Asks people to tell us how well the proposed permit would protect the receiving water.
- Invites people to suggest fairer conditions, limits, and requirements for the permit.
- Invites comments on Ecology's determination of compliance with antidegradation rules.
- Urges people to submit their comments, in writing, before the end of the comment period.
- Tells how to request a public hearing about the proposed NPDES permit.
- Explains the next step(s) in the permitting process.

Ecology has published a document entitled *Frequently Asked Questions about Effective Public Commenting* which is available on our website at http://www.ecy.wa.gov/biblio/0307023.html.

You may obtain further information from Ecology by telephone at (509) 329-3455 or by writing to the address listed below.

Water Quality Permit Coordinator
Department of Ecology
Eastern Regional Office
4601 North Monroe Street
Spokane, WA 99205-1295

The primary author of this permit and fact sheet is Richard A. Koch, P.E.

APPENDIX B—GLOSSARY

1-DMax or **1-day maximum temperature -** The highest water temperature reached on any given day. This measure can be obtained using calibrated maximum/minimum thermometers or continuous monitoring probes having sampling intervals of thirty minutes or less.

7-DADMax or **7-day average of the daily maximum temperatures -** The arithmetic average of seven consecutive measures of daily maximum temperatures. The 7-DADMax for any individual day is calculated by averaging that day's daily maximum temperature with the daily maximum temperatures of the three days prior and the three days after that date.

Acute Toxicity - The lethal effect of a compound on an organism that occurs in a short period of time, usually 48 to 96 hours.

AKART - The acronym for "all known, available, and reasonable methods of prevention, control and treatment." AKART is a technology-based approach to limiting pollutants from wastewater discharges which requires an engineering judgment and an economic judgment. AKART must be applied to all wastes and contaminants prior to entry into waters of the state in accordance with RCW 90.48.010 and 520, WAC 173-200-030(2)(c)(ii), and WAC 173-216-110(1)(a).

Ambient Water Quality - The existing environmental condition of the water in a receiving water body.

Ammonia - Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Annual Average Design Flow (AADF) - The average of the daily flow volumes anticipated to occur over a calendar year.

Average Monthly Discharge Limit - The average of the measured values obtained over a calendar month's time.

Best Management Practices (BMPs) - Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the state. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD_5 - Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD_5 is used in modeling to measure the reduction of dissolved oxygen in receiving waters after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass - The intentional diversion of waste streams from any portion of a treatment facility.

Chlorine - Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity - The effect of a compound on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA) - The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Compliance Inspection - Without Sampling - A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection - With Sampling - A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations. In addition it includes as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the 85 percent removal requirement. Ecology may conduct additional sampling.

Composite Sample - A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

Construction Activity - Clearing, grading, excavation, and any other activity which disturbs the surface of the land. Such activities may include road building; construction of residential houses, office buildings, or industrial buildings; and demolition activity.

Continuous Monitoring - Uninterrupted, unless otherwise noted in the permit.

Critical Condition - The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Dilution Factor (DF) - A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the percent effluent fraction, for example, a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Engineering Report - A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report must contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria - Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample - A single sample or measurement taken at a specific time or over as short a period of time as is feasible.

Industrial Wastewater - Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business; from the development of any natural resource; or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Major Facility - A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limit - The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Maximum Day Design Flow (MDDF) - The largest volume of flow anticipated to occur during a one-day period, expressed as a daily average.

Maximum Month Design Flow (MMDF) - The largest volume of flow anticipated to occur during a continuous 30-day period, expressed as a daily average.

Maximum Week Design Flow (MWDF) - The largest volume of flow anticipated to occur during a continuous 7-day period, expressed as a daily average.

Method Detection Level (MDL) - The minimum concentration of a substance that can be measured and reported with 99 percent confidence that the pollutant concentration is above zero and is determined from analysis of a sample in a given matrix containing the pollutant.

Minor Facility - A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone - An area that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in state regulations (chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES) - The NPDES (Section 402 of the Clean Water Act) is the federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the state of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both state and federal laws.

pH - The pH of a liquid measures its acidity or alkalinity. It is the negative logarithm of the hydrogen ion concentration. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Peak Hour Design Flow (PHDF) - The largest volume of flow anticipated to occur during a one-hour period, expressed as a daily or hourly average.

Peak Instantaneous Design Flow (PIDF) - The maximum anticipated instantaneous flow.

Quantitation Level (QL) - The smallest detectable concentration of analyte greater than the Method Detection Limit (MDL) where the accuracy (precision &bias) achieves the objectives of the intended purpose.

Reasonable Potential - A reasonable potential to cause a water quality violation, or loss of sensitive and/or important habitat.

Responsible Corporate Officer - A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or have gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures (40 CFR 122.22).

Technology-based Effluent Limit - A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS) - Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to receiving waters may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Solid waste - All putrescible and non-putrescible solid and semisolid wastes including, but not limited to, garbage, rubbish, ashes, industrial wastes, swill, sewage sludge, demolition and construction wastes, abandoned vehicles or parts thereof, contaminated soils and contaminated dredged material, and recyclable materials.

State Waters - Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater - That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Upset - An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit - A limit on the concentration of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into receiving waters.

APPENDIX C—TECHNICAL CALCULATIONS

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on Ecology's homepage at http://www.ecy.wa.gov/programs/eap/pwspread/pwspread.html.

APPENDIX D—RESPONSE TO COMMENTS

The public notice that informed the public that a draft permit was available for review was published in the Tri-City Herald on May 12, 2010. Ecology did not receive any comments on the draft permit following the 30-day public comment period.

Issuance Date: June 29, 2010
Effective Date: July 1, 2010
Expiration Date: June 30, 2015

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM WASTE DISCHARGE PERMIT No. WA-004496-2

State of Washington
DEPARTMENT OF ECOLOGY
Olympia, Washington 98504-7600

In compliance with the provisions of
The State of Washington Water Pollution Control Law
Chapter 90.48 Revised Code of Washington
and
The Federal Water Pollution Control Act
(The Clean Water Act)
Title 33 United States Code, Section 1342 et seq.

City of Pasco
P.O. Box 293
1015 S. Grey Street
Pasco, WA 99301

is authorized to discharge in accordance with the Special and General Conditions that follow.

Plant Location: 1015 South Grey Street	Receiving Water: Columbia River, at RM 327.6 of the McNary Pool reach of the river. Aka Lake Wallula
Waterbody I.D. No.: - 1189897461506	Discharge Location: Latitude: 46° 12' 58" N Longitude: 119° 05' 12" W
Plant Type: Advanced Secondary treatment with activated sludge and ultraviolet light disinfection	

James M. Bellatty
Water Quality Section Manager
Eastern Regional Office
Washington State Department of Ecology

TABLE OF CONTENTS

GENERAL CONDITIONS

SUMMARY OF PERMIT REPORT SUBMITTALS

Refer to the Special and General Conditions of this permit for additional submittal requirements.

Permit Section	Submittal	Frequency	First Submittal Date
S3	Discharge Monitoring Report	Monthly	August 15, 2010
S3.E	Reporting Permit Violations	As necessary	
S3.F	Other Reporting	As necessary	
S4.B	Plans for Maintaining Adequate Capacity	As necessary	
S4.D	Notification of New or Altered Sources	As necessary	
S5.G.	Operations and Maintenance Manual Update or Review Confirmation Letter	Annually	
S6.E	Local Limits Development	1/permit cycle	April 15, 2011
S8.	Engineering Report	1/permit cycle	January 15, 2011
S9.	Permit Application	1/permit cycle	December 31, 2014
G1.C	Notice of Change in Authorization	As necessary	
G4	Reporting Planned Changes	As necessary	
G5	Engineering Report for Construction or Modification Activities	As necessary	
G7	Notice of Permit Transfer	As necessary	
G10	Duty to Provide Information	As necessary	
G23	Contract Submittal	As necessary	

SPECIAL CONDITIONS

In this permit, the word "must" denotes an action that is mandatory and is equivalent to the word "shall" used in previous permits.

S1. DISCHARGE LIMITS

A. Effluent Limits

All discharges and activities authorized by this permit must comply with the terms and conditions of this permit. The discharge of any of the following pollutants more frequently than, or at a level in excess of, that identified and authorized by this permit violates the terms and conditions of this permit.

Beginning on the effective date of this permit and lasting through the expiration date, the Permittee may discharge municipal wastewater at the permitted location subject to compliance with the following limits:

EFFLUENT LIMITS: OUTFALL # 1		
Parameter	**Average Monthly** [a]	**Average Weekly** [b]
Biochemical Oxygen Demand (5-day)	30 mg/L, 1131 lbs/day 85% removal of influent BOD	45 mg/L, 1696 lbs/day
Total Suspended Solids	30 mg/L, 1131 lbs/day 85% removal of influent TSS	45 mg/L, 1696 lbs/day
Fecal Coliform Bacteria [c]	200/100 mL	400/100 mL
pH [d]	Daily minimum is equal to or greater than 6.0 and the daily maximum is less than or equal to 9.0.	

a	Average monthly effluent limit means the highest allowable average of daily discharges over a calendar month. To calculate the discharge value to compare to the limit, you add the value of each daily discharge measured during a calendar month and divide this sum by the total number of daily discharges measured. See footnote c for fecal coliform calculations.
b	Average weekly discharge limitation means the highest allowable average of "daily discharges" over a calendar week, calculated as the sum of all "daily discharge" measured during a calendar week divided by the number of "daily discharges" measured during that week. See footnote [c] for fecal coliform calculations.
c	To calculate the average monthly and average weekly values for fecal coliforms you must use the geometric mean. Ecology gives directions to calculate this value in publication No. 04-10-020, *Information Manual for Treatment Plant Operators* available at: http://www.ecy.wa.gov/pubs/0410020.pdf
d	Indicates the range of permitted values. The Permittee must report the instantaneous maximum and minimum pH monthly. Do not average pH values.

B. Mixing Zone Authorization

The following paragraphs define the maximum boundaries or flow-volume restriction of the mixing zones:

The chronic mixing zone shall extend no more than 330 feet downstream from the point of discharge.

The acute mixing zone shall extend no more than 33 feet downstream of the point of discharge.

Available Dilution (dilution factor)	
Acute Aquatic Life Criteria	1:181
Chronic Aquatic Life Criteria	1:2198
Human Health Criteria - Carcinogen	1:8477
Human Health Criteria - Non-carcinogen	1:3077

S2. MONITORING REQUIREMENTS

A. Monitoring Schedule

The Permittee must monitor in accordance with the following schedule and must use the laboratory methods, and meet the detection levels (DL), and quantitation levels (QL) specified in Appendix A. The Permittee may use alternative methods included in 40 CFR Part 136 if the DL and QL are equivalent to those specified in Appendix A or if the alternative method's DL and QL are low enough to detect the parameter:

Parameter	Units	Minimum Sampling Frequency	Sample Type
(1) Wastewater Influent			
Wastewater Influent means the raw sewage flow. Sample the wastewater entering the headworks of the treatment plant excluding any side-stream returns from inside the plant.			
Flow	MGD	Daily	Continuous measurement [b]
BOD_5	mg/L	2/week	24 hour composite [c]
BOD_5	lbs/day	2/week	24 hour composite [c]
TSS	mg/L	2/week	24 hour composite [c]
TSS	lbs/day	2/week	24 hour composite [c]
Ammonia Nitrogen (NH_3-N)	mg/L	2/week	24 hour composite [c]
Total Phosphorus	mg/L	2/month on alternate weeks	24 hour composite [c]

Parameter	Units	Minimum Sampling Frequency	Sample Type
Temperature	°C	Daily	Continuous with thermistor or equal See. S.2.C.3
Dissolved Oxygen	mg/L	Daily	Grab [e]
pH	std units	Daily	Grab [e]
Cyanide	mg/L	Quarterly [a]	Grab [e]
Phenols	mg/L	Quarterly [a]	Grab [e]
volatile organic compounds	mg/L	Twice a year – February and August	24 hour composite [c]
base-neutral compounds	mg/L	Twice a year – February and August	24 hour composite [c]
acid-extractable compounds	mg/L	Twice a year – February and August	24 hour composite [c]
Copper	ug/L	Quarterly [a]	24 hour composite [c]
Lead	ug/L	Yearly in first quarter [a]	24 hour composite [c]
Cadmium	ug/L	Yearly in first quarter [a]	24 hour composite [c]
Mercury	ug/L	Yearly in first quarter [a]	24 hour composite [c]
(2) Final Wastewater Effluent			
Final Wastewater Effluent means wastewater which is exiting, or has exited, the last treatment process or operation. Typically, this is after or at the exit from the disinfection process. The Permittee may take effluent samples for the BOD5 analysis before or after the disinfection process. If taken after, dechlorinate if appropriate and reseed the sample.			
Flow	MGD	Daily	Continuous measurement [b]
BOD_5	mg/L	2/week	24 hour composite [c]
BOD_5	lbs/day	2/week	24 hour composite [c]
BOD_5	% removal [d]	2/week	24 hour composite [c]
TSS	mg/L	2/week	24 hour composite [c]
TSS	lbs/day	2/week	24 hour composite [c]
TSS	% removal [d]	2/week	24 hour composite [c]
Ammonia Nitrogen (NH_3-N)	mg/L	2/week	24 hour composite [c]
Total Phosphorus	mg/L	2/month on alternate weeks	24 hour composite [c]
Fecal Coliform	Org./100 ml	2/week	Grab [e]
pH	Standard Units	Daily	Grab [e]
Temperature	°C	Daily	Continuous with thermistor or equal See. S.2.C.3

Parameter	Units	Minimum Sampling Frequency	Sample Type
Dissolved Oxygen	mg/L	5/week	Grab [e]
Cyanide	mg/L	Quarterly [b]	Grab [e]
Phenols	mg/L	Quarterly [b]	Grab [e]
volatile compounds [g]	mg/L	Twice a year – February and August	24 hour composite [c]
base-neutral compounds [g]	mg/L	Twice a year – February and August	24 hour composite [c]
acid compounds [g]	mg/L	Twice a year – February and August	24 hour composite [c]
Copper	ug/L	Quarterly [b]	24 hour composite [c]
Arsenic	ug/L	Yearly in first quarter [b]	24 hour composite [c]
Cadmium	ug/L	Yearly in first quarter [b]	24 hour composite [c]
Lead	ug/L	Yearly in first quarter [b]	24 hour composite [c]
Mercury	ug/L	Yearly in first quarter [b]	24 hour composite [c]
Molybdenum	ug/L	Yearly in first quarter [b]	24 hour composite [c]
Selenium	ug/L	Yearly in first quarter [b]	24 hour composite [c]
Zinc	ug/L	Yearly in first quarter [b]	24 hour composite [c]
For Temperature sampling measured continuously, the Permittee must determine and report a daily maximum from half-hour measurements in a 24-hour period. To determine the daily average, use the temperature on the half-hour from the chart for the twenty-four (24) hour period and calculate the average of the values. Continuous monitoring instruments must achieve an accuracy of 0.2 degrees C and the Permittee must verify accuracy annually. See S.2.C.3.			
The Permittee must record and report the wastewater treatment plant flow discharged on the day it collects the sample for priority pollutant testing with the discharge monitoring report.			
[a] Quarter is defined as: Jan.-March, April – June, July – Sept., October – December			
[b] Continuous means uninterrupted except for brief lengths of time for calibration, for power failure, or for unanticipated equipment repair or maintenance.			
[c] 24-hour composite means a series of individual samples collected over a 24-hour period into a single container, and analyzed as one sample.			
[d] Calculate the Percent (%) removal of BOD and TSS using the following algorithm (concentrations in mg/L): (Average Monthly Influent Concentration - Average Monthly Effluent Concentration)/Average Monthly Influent Concentration.			
[e] Grab means an individual sample collected over a fifteen (15) minute, or less, period.			
[f] 3/week means three (3) times during each calendar week and on a rotational basis throughout the days of the week, except weekends and holidays.			
[g] See Appendix A for the specific parameters and the required detection (DL) or quantitation (QL) levels. Report single analytical values below detection as “less than (detection level)” where (detection level) is the numeric value specified in attachment A.			

Parameter	Units	Minimum Sampling Frequency	Sample Type
Report single analytical values between the agency-required detection and quantitation levels with qualifier code of j following the value. To calculate the average value (monthly average): • Use the reported numeric value for all parameters measured between the agency-required detection value and the agency-required quantitation value. • For values reported below detection, use one-half the detection value if the lab detected the parameter in another sample for the reporting period. • For values reported below detection, use zero if the lab did not detect the parameter in another sample for the reporting period. If the Permittee is unable to obtain the required DL and QL in its effluent due to matrix effects, the Permittee must submit a matrix specific MDL and a QL to Ecology with appropriate laboratory documentation.			

B. Sampling and Analytical Procedures

Samples and measurements taken to meet the requirements of this permit must represent the volume and nature of the monitored parameters. The Permittee must conduct representative sampling of any unusual discharge or discharge condition, including bypasses, upsets, and maintenance-related conditions that may affect effluent quality.

Sampling and analytical methods used to meet the monitoring requirements specified in this permit must conform to the latest revision of the *Guidelines Establishing Test Procedures for the Analysis of Pollutants* contained in 40 CFR Part 136.

C. Flow Measurement, and Continuous Monitoring Devices

The Permittee must:

1. Select and use appropriate flow measurement and continuous monitoring devices and methods consistent with accepted scientific practices.
2. Install, calibrate, and maintain these devices to ensure the accuracy of the measurements is consistent with the accepted industry standard and the manufacturer's recommendation for that type of device.
3. If the Permittee uses micro-recording temperature devices known as thermistors it must calibrate the devices using protocols from Ecology's Quality Assurance Project Plan Development Tool (*Continuous Temperature Sampling Protocols for the Environmental Monitoring and Trends*). This document is available online at http://www.ecy.wa.gov/programs/eap/qa/docs/QAPPtool/Mod6%20Ecology%20SOPs/Protocols/ContinuousTemperatureSampling.pdf. Calibration as specified in this document is not required if the Permittee uses recording devices which are certified by the manufacturer.
4. Calibrate flow monitoring devices at a minimum frequency of at least one calibration per year.
5. Maintain calibration records for at least three years.

D. <u>Laboratory Accreditation</u>

The Permittee must ensure that all monitoring data required by Ecology is prepared by a laboratory registered or accredited under the provisions of chapter 173-50 WAC, *Accreditation of Environmental Laboratories.* Flow, temperature, settleable solids, conductivity, pH, and internal process control parameters are exempt from this requirement.

S3. REPORTING AND RECORDING REQUIREMENTS

The Permittee must monitor and report in accordance with the following conditions. Falsification of information submitted to Ecology is a violation of the terms and conditions of this permit.

A. <u>Reporting</u>

The first monitoring period begins on the effective date of the permit. The Permittee must:

1. Submit monitoring results each month.
2. Summarize, report, and submit monitoring data obtained during each monitoring period on a Discharge Monitoring Report (DMR) form provided, or otherwise approved, by Ecology.
3. Submit DMR forms monthly whether or not the facility was discharging. If the facility did not discharge during a given monitoring period, submit the form as required with the words "NO DISCHARGE" entered in place of the monitoring results.
4. Ensure that DMR forms are postmarked or received by Ecology no later than the 15th day of the month following the completed monitoring period, unless otherwise specified in this permit.
5. Submit priority pollutant analysis data no later than forty-five (45) days following the monitoring.
6. Send report(s) to Ecology at:

Water Quality Permit Coordinator
Department of Ecology
Eastern Regional Office
4601 North Monroe Street
Spokane, WA 99205-1295

All laboratory reports providing data for organic and metal parameters must include the following information: sampling date, sample location, date of analysis, parameter name, CAS number, analytical method/number, method detection limit (MDL), laboratory practical quantitation limit (PQL), reporting units, and concentration detected. Analytical results from samples sent to a contract laboratory must include information on the chain of custody, the analytical method, QA/QC results, and documentation of accreditation for the parameter.

B. Records Retention

The Permittee must retain records of all monitoring information for a minimum of three (3) years. Such information must include all calibration and maintenance records and all original recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit. The Permittee must extend this period of retention during the course of any unresolved litigation regarding the discharge of pollutants by the Permittee or when requested by Ecology.

C. Recording of Results

For each measurement or sample taken, the Permittee must record the following information:

1. The date, exact place, method, and time of sampling or measurement.
2. The individual who performed the sampling or measurement.
3. The dates the analyses were performed.
4. The individual who performed the analyses.
5. The analytical techniques or methods used.
6. The results of all analyses.

D. Additional Monitoring by the Permittee

If the Permittee monitors any pollutant more frequently than required by Condition S2 of this permit, then the Permittee must include the results of such monitoring in the calculation and reporting of the data submitted in the Permittee's DMR.

E. Reporting Permit Violations

The Permittee must take the following actions when it violates or is unable to comply with any permit condition:

a. Immediately take action to stop, contain, and cleanup unauthorized discharges or otherwise stop the noncompliance and correct the problem.

b. If applicable, immediately repeat sampling and analysis. Submit the results of any repeat sampling to Ecology within thirty (30) days of sampling.

1. Immediate Reporting

   The Permittee must report any failure of the disinfection system immediately to the Department of Ecology's Regional Office 24-hr. number listed below:

Eastern Regional Office	509-329-3400

   The Permittee must report any failure of the disinfection system, any collection system overflows, or any plant bypass discharging to a waterbody used as a source of drinking water immediately to the Department of Ecology and the Department of Health, Drinking Water Program at the numbers listed below:

Eastern Regional Office	509-329-3400
Department of Health,	360-521-0323 (business hours)
Drinking Water Program	360-481-4901 (after business hours)

2. Twenty-four-hour Reporting

   The Permittee must report the following occurrences of noncompliance by telephone, to Ecology at (509)329-3400, within 24 hours from the time the Permittee becomes aware of any of the following circumstances:

   a. Any noncompliance that may endanger health or the environment, unless previously reported under subpart 1, above.

   b. Any unanticipated **bypass** that exceeds any effluent limitation in the permit (See Part S4.B., “Bypass Procedures”).

   c. Any **upset** that exceeds any effluent limitation in the permit (See G.15, “Upset”).

   d. Any violation of a maximum daily or instantaneous maximum discharge limitation for any of the pollutants in Section S1.A of this permit.

   e. Any overflow prior to the treatment works, whether or not such overflow endangers health or the environment or exceeds any effluent limitation in the permit.

3. Report Within Five Days

   The Permittee must also provide a written submission within five days of the time that the Permittee becomes aware of any event required to be reported under subparts 1 or 2, above. The written submission must contain:

   a. A description of the noncompliance and its cause.

   b. The period of noncompliance, including exact dates and times.

   c. The estimated time noncompliance is expected to continue if it has not been corrected.

d. Steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

e. If the noncompliance involves an overflow prior to the treatment works, an estimate of the quantity (in gallons) of untreated overflow.

4. Waiver of Written Reports

Ecology may waive the written report required in subpart 3, above, on a case-by-case basis upon request if a timely oral report has been received.

5. All Other Permit Violation Reporting

The Permittee must report all permit violations, which do not require immediate or within 24 hours reporting, when it submits monitoring reports for S3.A ("Reporting"). The reports must contain the information listed in paragraph E.3, above. Compliance with these requirements does not relieve the Permittee from responsibility to maintain continuous compliance with the terms and conditions of this permit or the resulting liability for failure to comply.

6. Report Submittal

The Permittee must submit reports to the address listed in S3.

F. Maintaining a Copy of This Permit

The Permittee must keep a copy of this permit at the facility and make it available upon request to Ecology inspectors.

S4. FACILITY LOADING

A. Design Criteria

The flows or waste loads for the permitted facility must not exceed the following design criteria:

Influent Loadings in the Design Criteria	Year 2030
Flow	
Average Annual (MGD)	TBD
Maximum Month (MGD)	TBD
Maximum Day (MGD)	TBD
Maximum Hour (MGD)	TBD
Wastewater Loadings	
BOD_5 – Average Annual (1,000 lbs/day)	TBD
BOD_5 – Maximum Month (1,000 lbs/day)	TBD
TSS – Average Annual (1,000 lbs/day)	TBD
TSS – Maximum Month (1,000 lbs/day)	TBD
Ammonia – Average Annual (1,000 lbs/day)	TBD
Ammonia – Maximum Month (1,000 lbs/day)	TBD

B. Plans for Maintaining Adequate Capacity

See section S8, Compliance Schedule.

C. Duty to Mitigate

The Permittee must take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

D. Notification of New or Altered Sources

1. The Permittee must submit written notice to Ecology whenever any new discharge or a substantial change in volume or character of an existing discharge into the POTW is proposed which:

    a. Would interfere with the operation of, or exceed the design capacity of, any portion of the POTW;

    b. Is not part of an approved general sewer plan or approved plans and specifications; or

    c. Would be subject to pretreatment standards under 40 CFR Part 403 and Section 307(b) of the Clean Water Act.

2. This notice must include an evaluation of the POTW's ability to adequately transport and treat the added flow and/or waste load, the quality and volume of effluent to be discharged to the POTW, and the anticipated impact on the Permittee's effluent [40 CFR 122.42(b)].

S5. OPERATION AND MAINTENANCE

The Permittee must at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance also includes keeping a daily operation logbook (paper or electronic), adequate laboratory controls, and appropriate quality assurance procedures. This provision of the permit requires the Permittee to operate backup or auxiliary facilities or similar systems only when the operation is necessary to achieve compliance with the conditions of this permit.

A. Certified Operator

This permitted facility must be operated by an operator certified by the state of Washington for at least a Class III plant. This operator must be in responsible charge of the day-to-day operation of the wastewater treatment plant. An operator certified for at least a Class II plant must be in charge during all regularly scheduled shifts.

B. O & M Program

The Permittee must:

1. Institute an adequate operation and maintenance program for the entire sewage system.

2. Keep maintenance records on all major electrical and mechanical components of the treatment plant, as well as the sewage system and pumping stations. Such records must clearly specify the frequency and type of maintenance recommended by the manufacturer and must show the frequency and type of maintenance performed.

3. Make maintenance records available for inspection at all times.

C. Short-term Reduction

The Permittee must schedule any facility maintenance, which might require interruption of wastewater treatment and degrade effluent quality, during non-critical water quality periods and carry this maintenance out in a manner approved by Ecology.

If a Permittee contemplates a reduction in the level of treatment that would cause a violation of permit discharge limits on a short-term basis for any reason, and such reduction cannot be avoided, the Permittee must:

1. Give written notification to Ecology, if possible, thirty (30) days prior to such activities.

2. Detail the reasons for, length of time of, and the potential effects of the reduced level of treatment.

This notification does not relieve the Permittee of its obligations under this permit.

D. Electrical Power Failure

The Permittee must ensure that adequate safeguards prevent the discharge of untreated wastes or wastes not treated in accordance with the requirements of this permit during electrical power failure at the treatment plant and/or sewage lift stations. Adequate safeguards include, but are not limited to: alternate power sources, standby generator(s), or retention of inadequately treated wastes.

For Reliability Class II - The Permittee must maintain Reliability Class II (EPA 430/9-74-001) at the wastewater treatment plant, Reliability Class II requires a backup power source sufficient to operate all vital components and critical lighting and ventilation during peak wastewater flow conditions. Vital components used to support the secondary processes (i.e., mechanical aerators or aeration basin air compressors) need not be operable to full levels of treatment, but must be sufficient to maintain the biota.

E. Prevent Connection of Inflow

The Permittee must strictly enforce its sewer ordinances and not allow the connection of inflow (roof drains, foundation drains, etc.) to the sanitary sewer system.

F. Bypass Procedures

This permit prohibits a bypass which is the intentional diversion of waste streams from any portion of a treatment facility. Ecology may take enforcement action against a Permittee for a bypass unless one of the following circumstances (1, 2, or 3) applies.

1. Bypass for Essential Maintenance without the Potential to Cause Violation of Permit Limits or Conditions.

Bypass is authorized if it is for essential maintenance and does not have the potential to cause violations of limits or other conditions of this permit, or adversely impact public health as determined by Ecology prior to the bypass. The Permittee must submit prior notice, if possible, at least ten (10) days before the date of the bypass.

2. Bypass which is Unavoidable, Unanticipated, and Results in Noncompliance of this Permit.

   This bypass is permitted only if:

   a. Bypass is unavoidable to prevent loss of life, personal injury, or severe property damage. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which would cause them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass.

   b. No feasible alternatives to the bypass exist, such as:

      - The use of auxiliary treatment facilities.
      - Retention of untreated wastes.
      - Stopping production.
      - Maintenance during normal periods of equipment downtime, but not if the Permittee should have installed adequate backup equipment in the exercise of reasonable engineering judgment to prevent a bypass.
      - Transport of untreated wastes to another treatment facility or preventative maintenance), or transport of untreated wastes to another treatment facility.

   c. Ecology is properly notified of the bypass as required in condition S3E of this permit.

3. If bypass is anticipated and has the potential to result in noncompliance of this permit.

a. The Permittee must notify Ecology at least thirty (30) days before the planned date of bypass. The notice must contain:

- A description of the bypass and its cause.
- An analysis of all known alternatives which would eliminate, reduce, or mitigate the need for bypassing.
- A cost-effectiveness analysis of alternatives including comparative resource damage assessment.
- The minimum and maximum duration of bypass under each alternative.
- A recommendation as to the preferred alternative for conducting the bypass.
- The projected date of bypass initiation.
- A statement of compliance with SEPA.
- A request for modification of water quality standards as provided for in WAC 173-201A-410, if an exceedance of any water quality standard is anticipated.
- Details of the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the bypass.

b. For probable construction bypasses, the Permittee must notify Ecology of the need to bypass as early in the planning process as possible. The Permittee must consider the analysis required above during preparation of the engineering report or facilities plan and plans and specifications and must include these to the extent practical. In cases where the Permittee determines the probable need to bypass early, the Permittee must continue to analyze conditions up to and including the construction period in an effort to minimize or eliminate the bypass.

c. Ecology will consider the following prior to issuing an administrative order for this type of bypass:

- If the bypass is necessary to perform construction or maintenance-related activities essential to meet the requirements of this permit.

- If feasible alternatives to bypass exist, such as the use of auxiliary treatment facilities, retention of untreated wastes, stopping production, maintenance during normal periods of equipment down time, or transport of untreated wastes to another treatment facility.

- If the Permittee planned and scheduled the bypass to minimize adverse effects on the public and the environment.

After consideration of the above and the adverse effects of the proposed bypass and any other relevant factors, Ecology will approve or deny the request. Ecology will give the public an opportunity to comment on bypass incidents of significant duration, to the extent feasible. Ecology will approve a request to bypass by issuing an administrative order under RCW 90.48.120.

G. Operations and Maintenance Manual

The Permittee must:

1. Review the O&M Manual at least annually and confirm this review by letter to Ecology.
2. Submit to Ecology for review and approval substantial changes or updates to the O&M Manual whenever it incorporates them into the manual.
3. Keep the approved O&M Manual at the permitted facility.
4. Follow the instructions and procedures of this manual.

S6. PRETREATMENT

A. General Requirements

The Permittee must work with Ecology to ensure that all commercial and industrial users of the publicly owned treatment works (POTW) comply with the pretreatment regulations in 40 CFR Part 403 and any additional regulations that the Environmental Protection Agency (U.S. EPA) may promulgate under Section 307(b) (pretreatment) and 308 (reporting) of the Federal Clean Water Act.

B. Duty to Enforce Discharge Prohibitions

1. Under 40 CFR 403.5(a), the Permittee must not authorize or knowingly allow the discharge of any pollutants into its POTW which may be reasonably expected to cause pass through or interference, or which otherwise violate general or specific discharge prohibitions contained in 40 CFR Part 403.5 or WAC-173-216-060.

2. The Permittee must not authorize or knowingly allow the introduction of any of the following into their treatment works:

   a. Pollutants which create a fire or explosion hazard in the POTW (including, but not limited to waste streams with a closed cup flashpoint of less than 140 degrees Fahrenheit or 60 degrees Centigrade using the test methods specified in 40 CFR 261.21).

   b. Pollutants which will cause corrosive structural damage to the POTW, but in no case discharges with pH lower than 5.0, or greater than 11.0 standard units, unless the works are specifically designed to accommodate such discharges.

   c. Solid or viscous pollutants in amounts that could cause obstruction to the flow in sewers or otherwise interfere with the operation of the POTW.

   d. Any pollutant, including oxygen demanding pollutants, (BOD, etc.) released in a discharge at a flow rate and/or pollutant concentration which will cause interference with the POTW.

e. Petroleum oil, non-biodegradable cutting oil, or products of mineral origin in amounts that will cause interference or pass through.

f. Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity which may cause acute worker health and safety problems.

g. Heat in amounts that will inhibit biological activity in the POTW resulting in interference but in no case heat in such quantities such that the temperature at the POTW headworks exceeds 40 degrees Centigrade (104 degrees Fahrenheit) unless Ecology, upon request of the Permittee, approves, in writing, alternate temperature limits.

h. Any trucked or hauled pollutants, except at discharge points designated by the Permittee.

i. Wastewaters prohibited to be discharged to the POTW by the Dangerous Waste Regulations (chapter 173-303 WAC), unless authorized under the Domestic Sewage Exclusion (WAC 173-303-071).

3. The Permittee must also not allow the following discharges to the POTW unless approved in writing by Ecology:

   a. Noncontact cooling water in significant volumes.

   b. Stormwater and other direct inflow sources.

   c. Wastewaters significantly affecting system hydraulic loading, which do not require treatment, or would not be afforded a significant degree of treatment by the system.

4. The Permittee must notify Ecology if any industrial user violates the prohibitions listed in this section (S6.B), and initiate enforcement action to promptly curtail any such discharge.

C. Wastewater Discharge Permit Required

The Permittee must require all non-domestic discharges to apply for a permit, and may not allow any significant industrial users (SIUs) to discharge wastewater to the Permittee's sewer system until such user has received a wastewater discharge permit from Ecology in accordance with chapter 90.48 RCW and chapter 173-216 WAC.

D. Identification and Reporting of Existing, New, and Proposed Industrial Users

1. The Permittee must take continuous, routine measures to identify all existing, new, and proposed SIUs and potential significant industrial users (PSIUs) discharging or proposing to discharge to the Permittee's sewer system (see Appendix B of the Fact Sheet for definitions).

2. Within 30 days of becoming aware of an unpermitted existing, new, or proposed industrial user who may be an SIU, the Permittee must notify such user by registered mail that, if classified as an SIU, they must apply to Ecology and obtain a State Waste Discharge Permit. The Permittee must send a copy of this notification letter to Ecology within this same 30-day period.
3. The Permittee must also notify all Potential SIUs (PSIUs), as they are identified, that if their classification should change to an SIU, they must apply to Ecology for a State Waste Discharge Permit within 30 days of such change.

E. Local Limit Development

By **April 15, 2011**, the Permittee shall, in consultation with the Department, reevaluate and update their local limits in order to prevent pass through or interference.

If Ecology determines that any pollutant present causes pass through or interference, or exceeds established sludge standards, the Permittee must establish new local limits or revise existing local limits as required by 40 CFR 403.5. Ecology may also require the Permittee to revise or establish local limits for any pollutant discharged from the POTW that has a reasonable potential to exceed the Water Quality Standards, or established effluent limits, or causes whole effluent toxicity. The determination by the Department shall be in the form of an Administrative Order.

S7. SOLID WASTES

A. Solid Waste Handling

The Permittee must handle and dispose of all solid waste material in such a manner as to prevent its entry into state ground or surface water.

B. Leachate

The Permittee must not allow leachate from its solid waste material to enter state waters without providing all known, available and reasonable methods of treatment, nor allow such leachate to cause violations of the State Surface Water Quality Standards, Chapter 173-201A WAC, or the State Ground Water Quality Standards, Chapter 173-200 WAC. The Permittee must apply for a permit or permit modification as may be required for such discharges to state ground or surface waters.

S8. COMPLIANCE SCHEDULE

A. The Permittee must prepare and submit two copies of an approvable engineering report or facility plan in accordance with chapter 173-240 WAC to Ecology for review and approval by **January 15, 2011**.

B. The engineering report must evaluate the hydraulic and organic loading capacity of the City of Pasco’s wastewater facilities as they currently exist and if necessary recommend upgrades appropriate for the wastewater facilities to provide 20 years of additional service to the community. The engineering report must include a Tier II analysis demonstrating that accommodating an additional 20 years the hydraulic and organic loading capacity will not cause measurable degradation to existing water quality at the edge of a chronic mixing zone.

C. The report must contain any appropriate requirements as described in *Water Reclamation and Reuse Standards* (Washington State Department of Ecology and Department of Health Publication No. 97-23, 1997). As required by RCW 90.48.112, the report must address the feasibility of using reclaimed water as defined in RCW 90.46.010.

S9. APPLICATION FOR PERMIT RENEWAL

The Permittee must submit an application for renewal of this permit by December 31, 2014. The Permittee need only submit an updated EPA Form 1 unless it has made significant changes and needs to update Form 2A.

GENERAL CONDITIONS

G1. SIGNATORY REQUIREMENTS

A. All applications, reports, or information submitted to Ecology must be signed and certified.

1. In the case of corporations, by a responsible corporate officer.

   For the purpose of this section, a responsible corporate officer means:

   (i) A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions for the corporation, or

   (ii) The manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long-term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

2. In the case of a partnership, by a general partner.

3. In the case of sole proprietorship, by the proprietor.

4. In the case of a municipal, state, or other public facility, by either a principal executive officer or ranking elected official.

Applications for permits for domestic wastewater facilities that are either owned or operated by, or under contract to, a public entity shall be submitted by the public entity.

B. All reports required by this permit and other information requested by Ecology must be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

1. The authorization is made in writing by a person described above and submitted to Ecology.

2. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.)

C. Changes to authorization. If an authorization under paragraph B.2, above, is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph B.2, above, must be submitted to Ecology prior to or together with any reports, information, or applications to be signed by an authorized representative.

D. Certification. Any person signing a document under this section must make the following certification:

> "I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

G2. RIGHT OF INSPECTION AND ENTRY

The Permittee must allow an authorized representative of Ecology, upon the presentation of credentials and such other documents as may be required by law:

A. To enter upon the premises where a discharge is located or where any records must be kept under the terms and conditions of this permit.

B. To have access to and copy, at reasonable times and at reasonable cost, any records required to be kept under the terms and conditions of this permit.

C. To inspect, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, methods, or operations regulated or required under this permit.

D. To sample or monitor, at reasonable times, any substances or parameters at any location for purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act.

G3. PERMIT ACTIONS

This permit may be modified, revoked and reissued, or terminated either at the request of any interested person (including the Permittee) or upon Ecology's initiative. However, the permit may only be modified, revoked and reissued, or terminated for the reasons specified in 40 CFR 122.62, 40 CFR 122.64 or WAC 173-220-150 according to the procedures of 40 CFR 124.5.

A. The following are causes for terminating this permit during its term, or for denying a permit renewal application:

1. Violation of any permit term or condition.

2. Obtaining a permit by misrepresentation or failure to disclose all relevant facts.

3. A material change in quantity or type of waste disposal.

4. A determination that the permitted activity endangers human health or the environment, or contributes to water quality standards violations and can only be regulated to acceptable levels by permit modification or termination.

5. A change in any condition that requires either a temporary or permanent reduction, or elimination of any discharge or sludge use or disposal practice controlled by the permit.

6. Nonpayment of fees assessed pursuant to RCW 90.48.465.

7. Failure or refusal of the Permittee to allow entry as required in RCW 90.48.090.

B. The following are causes for modification but not revocation and reissuance except when the Permittee requests or agrees:

1. A material change in the condition of the waters of the state.

2. New information not available at the time of permit issuance that would have justified the application of different permit conditions.

3. Material and substantial alterations or additions to the permitted facility or activities which occurred after this permit issuance.

4. Promulgation of new or amended standards or regulations having a direct bearing upon permit conditions, or requiring permit revision.

5. The Permittee has requested a modification based on other rationale meeting the criteria of 40 CFR Part 122.62.

6. Ecology has determined that good cause exists for modification of a compliance schedule, and the modification will not violate statutory deadlines.

7. Incorporation of an approved local pretreatment program into a municipality's permit.

C. The following are causes for modification or alternatively revocation and reissuance:

1. When cause exists for termination for reasons listed in A1 through A7 of this section, and Ecology determines that modification or revocation and reissuance is appropriate.

2. When Ecology has received notification of a proposed transfer of the permit. A permit may also be modified to reflect a transfer after the effective date of an automatic transfer (General Condition G8) but will not be revoked and reissued after the effective date of the transfer except upon the request of the new Permittee.

G4. REPORTING PLANNED CHANGES

The Permittee must, as soon as possible, but no later than sixty (60) days prior to the proposed changes, give notice to Ecology of planned physical alterations or additions to the permitted facility, production increases, or process modification which will result in: 1) the permitted facility being determined to be a new source pursuant to 40 CFR 122.29(b); 2) a significant change in the nature or an increase in quantity of pollutants discharged; or 3) a significant change in the Permittee's sludge use or disposal practices. Following such notice, and the submittal of a new application or supplement to the existing application, along with required engineering plans and reports, this permit may be modified, or revoked and reissued pursuant to 40 CFR 122.62(a) to specify and limit any pollutants not previously limited. Until such modification is effective, any new or increased discharge in excess of permit limits or not specifically authorized by this permit constitutes a violation.

G5. PLAN REVIEW REQUIRED

Prior to constructing or modifying any wastewater control facilities, an engineering report and detailed plans and specifications must be submitted to Ecology for approval in accordance with chapter 173-240 WAC. Engineering reports, plans, and specifications must be submitted at least one hundred eighty (180) days prior to the planned start of construction unless a shorter time is approved by Ecology. Facilities must be constructed and operated in accordance with the approved plans.

G6. COMPLIANCE WITH OTHER LAWS AND STATUTES

Nothing in this permit must be construed as excusing the Permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.

G7. TRANSFER OF THIS PERMIT

In the event of any change in control or ownership of facilities from which the authorized discharge emanate, the Permittee must notify the succeeding owner or controller of the existence of this permit by letter, a copy of which must be forwarded to Ecology.

A. Transfers by Modification

Except as provided in paragraph (B) below, this permit may be transferred by the Permittee to a new owner or operator only if this permit has been modified or revoked and reissued under 40 CFR 122.62(b)(2), or a minor modification made under 40 CFR 122.63(d), to identify the new Permittee and incorporate such other requirements as may be necessary under the Clean Water Act.

B. Automatic Transfers

This permit may be automatically transferred to a new Permittee if:

1. The Permittee notifies Ecology at least thirty (30) days in advance of the proposed transfer date.

2. The notice includes a written agreement between the existing and new Permittees containing a specific date transfer of permit responsibility, coverage, and liability between them.

3. Ecology does not notify the existing Permittee and the proposed new Permittee of its intent to modify or revoke and reissue this permit. A modification under this subparagraph may also be minor modification under 40 CFR 122.63. If this notice is not received, the transfer is effective on the date specified in the written agreement.

G8. REDUCED PRODUCTION FOR COMPLIANCE

The Permittee, in order to maintain compliance with its permit, must control production and/or all discharges upon reduction, loss, failure, or bypass of the treatment facility until the facility is restored or an alternative method of treatment is provided. This requirement applies in the situation where, among other things, the primary source of power of the treatment facility is reduced, lost, or fails.

G9. REMOVED SUBSTANCES

Collected screenings, grit, solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters must not be resuspended or reintroduced to the final effluent stream for discharge to state waters.

G10. DUTY TO PROVIDE INFORMATION

The Permittee must submit to Ecology, within a reasonable time, all information which Ecology may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The Permittee must also submit to Ecology upon request, copies of records required to be kept by this permit.

G11. OTHER REQUIREMENTS OF 40 CFR

All other requirements of 40 CFR 122.41 and 122.42 are incorporated in this permit by reference.

G12. ADDITIONAL MONITORING

Ecology may establish specific monitoring requirements in addition to those contained in this permit by administrative order or permit modification.

G13. PAYMENT OF FEES

The Permittee must submit payment of fees associated with this permit as assessed by Ecology.

G14. PENALTIES FOR VIOLATING PERMIT CONDITIONS

Any person who is found guilty of willfully violating the terms and conditions of this permit is deemed guilty of a crime, and upon conviction thereof must be punished by a fine of up to ten thousand dollars ($10,000) and costs of prosecution, or by imprisonment in the discretion of the court. Each day upon which a willful violation occurs may be deemed a separate and additional violation.

Any person who violates the terms and conditions of a waste discharge permit will incur, in addition to any other penalty as provided by law, a civil penalty in the amount of up to ten thousand dollars ($10,000) for every such violation. Each and every such violation is a separate and distinct offense, and in case of a continuing violation, every day's continuance is deemed to be a separate and distinct violation.

G15. UPSET

Definition – “Upset” means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limits if the requirements of the following paragraph are met.

A Permittee who wishes to establish the affirmative defense of upset must demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:
1) an upset occurred and that the Permittee can identify the cause(s) of the upset;
2) the permitted facility was being properly operated at the time of the upset;
3) the Permittee submitted notice of the upset as required in Condition S3.E; and
4) the Permittee complied with any remedial measures required under S4.C of this permit.

In any enforcement action, the Permittee seeking to establish the occurrence of an upset has the burden of proof.

G16. PROPERTY RIGHTS

This permit does not convey any property rights of any sort, or any exclusive privilege.

G17. DUTY TO COMPLY

The Permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

G18. TOXIC POLLUTANTS

The Permittee must comply with effluent standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish those standards or prohibitions, even if this permit has not yet been modified to incorporate the requirement.

G19. PENALTIES FOR TAMPERING

The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit must, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than two (2) years per violation, or by both. If a conviction of a person is for a violation committed after a first conviction of such person under this condition, punishment must be a fine of not more than $20,000 per day of violation, or by imprisonment of not more than four (4) years, or by both.

G20. COMPLIANCE SCHEDULES

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit must be submitted no later than fourteen (14) days following each schedule date.

G21. CONTRACT REVIEW

The Permittee must submit to Ecology any proposed contract for the operation of any wastewater treatment facility covered by this permit. The review is to ensure consistency with chapters 90.46 and 90.48 RCW. In the event that Ecology does not comment within a thirty (30)-day period, the Permittee may assume consistency and proceed with the contract.

APPENDIX A

EFFLUENT CHARACTERIZATION FOR POLLUTANTS
THIS LIST INCLUDES EPA REQUIRED POLLUTANTS (PRIORITY POLLUTANTS) AND SOME ECOLOGY PRIORITY TOXIC CHEMICALS (PBTs)

The following table specifies analytical methods and levels to be used for effluent characterization in NPDES and State waste discharge permits. This appendix specifies effluent characterization requirements of the Department of Ecology unless other methods are specified in the body of this permit.

This permit specifies the compounds and groups of compounds to be analyzed. Ecology may require additional pollutants to be analyzed within a group. The objective of this appendix is to reduce the number of analytical “non-detects” in permit-required monitoring and to measure effluent concentrations near or below criteria values where possible at a reasonable cost. If a Permittee knows that an alternate, less sensitive method (higher DL and QL) from 40 CFR Part 136 is sufficient to produce measurable results in their effluent, that method may be used for analysis.

Pollutant & CAS No. *(if available)*	**Recommended Analytical Protocol**	**Detection (DL)[1]** ***µg/L unless specified***	**Quantitation Level (QL)[2]** ***µg/L unless specified***
CONVENTIONALS			
Biochemical Oxygen Demand	SM5210-B		2 mg/L
Chemical Oxygen Demand	SM5220-D		10 mg/L
Total Organic Carbon	SM5310-B/C/D		1 mg/L
Total Suspended Solids	SM2540-D		5 mg/L
Total Ammonia (as N)	SM4500-NH3-GH		0.3 mg/L
Flow	Calibrated device		
Dissolved oxygen	4500-OC/OG		0.2 mg/L
Temperature (max. 7-day avg.)	Analog recorder or Use micro-recording devices known as thermistors		0.2º C
pH	SM4500-H^+ B	N/A	N/A
NONCONVENTIONALS			
Total Alkalinity	SM2320-B		5 mg/L as CaCo3
Chlorine, Total Residual	4500 Cl G		50.0
Color	SM2120 B/C/E		10 color unit
Fecal Coliform	SM 9221D/E,9222	N/A	N/A

Fluoride (16984-48-8)	SM4500-F E	25	100
Nitrate-Nitrite (as N)	4500-NO3-E/F/H		100
Nitrogen, Total Kjeldahl (as N)	4500-NH3-C/E/FG		300
Ortho-Phosphate (PO_4 as P)	4500- PE/PF	3	10
Phosphorus, Total (as P)	4500-PE/PF	3	10
Oil and Grease (HEM)	1664A	1,400	5,000
Salinity	SM2520-B		3 PSS
Settleable Solids	SM2540 -F		100
Sulfate (as mg/L SO_4)	SM4110-B		200
Sulfide (as mg/L S)	4500-S^2F/D/E/G		200
Sulfite (as mg/L SO_3)	SM4500-SO3B		2000
Total dissolved solids	SM2540 C		20 mg/L
Total Hardness	2340B		200 as CaCO3
Aluminum, Total (7429-90-5)	200.8	2.0	10
Barium Total (7440-39-3)	200.8	0.5	2.0
Boron Total (7440-42-8)	200.8	2.0	10.0
Cobalt, Total (7440-48-4)	200.8	0.05	0.25
Iron, Total (7439-89-6)	200.7	12.5	50
Magnesium, Total (7439-95-4)	200.7	10	50
Molybdenum, Total (7439-98-7)	200.8	0.1	0.5
Manganese, Total (7439-96-5)	200.8	0.1	0.5
Tin, Total (7440-31-5)	200.8	0.3	1.5
METALS, CYANIDE & TOTAL PHENOLS			
Antimony, Total (7440-36-0)	200.8	0.3	1.0
Arsenic, Total (7440-38-2)	200.8	0.1	0.5
Beryllium, Total (7440-41-7)	200.8	0.1	0.5
Cadmium, Total (7440-43-9)	200.8	0.05	0.25
Chromium (hex) dissolved (18540-29-9)	SM3500-Cr EC	0.3	1.2
Chromium, Total (7440-47-3)	200.8	0.2	1.0
Copper, Total (7440-50-8)	200.8	0.4	2.0
Lead, Total (7439-92-1)	200.8	0.1	0.5
Mercury, Total (7439-97-6)	1631E	0.0002	0.0005
Nickel, Total (7440-02-0)	200.8	0.1	0.5
Selenium, Total (7782-49-2)	200.8	1.0	1.0
Silver, Total (7440-22-4)	200.8	0.04	0.2
Thallium, Total (7440-28-0)	200.8	0.09	0.36
Zinc, Total (7440-66-6)	200.8	0.5	2.5
Cyanide, Total (57-12-5)	335.4	2	10
Cyanide, Weak Acid Dissociable	SM4500-CN I	2	10
Phenols, Total	EPA 420.1		50

DIOXIN			
2,3,7,8-Tetra-Chlorodibenzo-P-Dioxin (176-40-16)	1613B	1.3 pg/L	5 pg/L
VOLATILE COMPOUNDS			
Acrolein (107-02-8)	624	5	10
Acrylonitrile (107-13-1)	624	1.0	2.0
Benzene (71-43-2)	624	1.0	2.0
Bromoform (75-25-2)	624	1.0	2.0
Carbon tetrachloride (56-23-5)	624/601 or SM6230B	1.0	2.0
Chlorobenzene (108-90-7)	624	1.0	2.0
Chloroethane (75-00-3)	624/601	1.0	2.0
2-Chloroethylvinyl Ether (110-75-8)	624	1.0	2.0
Chloroform (67-66-3)	624 or SM6210B	1.0	2.0
Dibromochloromethane (124-48-1)	624	1.0	2.0
1,2-Dichlorobenzene (95-50-1)	624	1.9	7.6
1,3-Dichlorobenzene (541-73-1)	624	1.9	7.6
1,4-Dichlorobenzene (106-46-7)	624	4.4	17.6
Dichlorobromomethane (75-27-4)	624	1.0	2.0
1,1-Dichloroethane (75-34-3)	624	1.0	2.0
1,2-Dichloroethane (107-06-2)	624	1.0	2.0
1,1-Dichloroethylene (75-35-4)	624	1.0	2.0
1,2-Dichloropropane (78-87-5)	624	1.0	2.0
1,3-dichloropropylene (mixed isomers) (542-75-6)	624	1.0	2.0
Ethylbenzene (100-41-4)	624	1.0	2.0
Methyl bromide (74-83-9) (Bromomethane)	624/601	5.0	10.0
Methyl chloride (74-87-3) (Chloromethane)	624	1.0	2.0
Methylene chloride (75-09-2)	624	5.0	10.0
1,1,2,2-Tetrachloroethane (79-34-5)	624	1.9	2.0
Tetrachloroethylene (127-18-4)	624	1.0	2.0
Toulene (108-88-3)	624	1.0	2.0
1,2-Trans-Dichloroethylene (156-60-5) (Ethylene dichloride)	624	1.0	2.0
1,1,1-Trichloroethane (71-55-6)	624	1.0	2.0

1,1,2-Trichloroethane (79-00-5)	624	1.0	2.0
Trichloroethylene (79-01-6)	624	1.0	2.0
Vinyl chloride (75-01-4)	624/SM6200B	1.0	2.0
ACID COMPOUNDS			
2-Chlorophenol (95-57-8)	625	1.0	2.0
2,4-Dichlorophenol (120-83-2)	625	0.5	1.0
2,4-Dimethylphenol (105-67-9)	625	0.5	1.0
4,6-dinitro-o-cresol (534-52-1) (2-methyl-4,6,-dinitrophenol)	625/1625B	1.0	2.0
2,4 dinitrophenol (51-28-5)	625	1.0	2.0
2-Nitrophenol (88-75-5)	625	0.5	1.0
4-nitrophenol (100-02-7)	625	0.5	1.0
Parachlorometa cresol (59-50-7) (4-chloro-3-methylphenol)	625	1.0	2.0
Pentachlorophenol (87-86-5)	625	0.5	1.0
Phenol (108-95-2)	625	2.0	4.0
2,4,6-Trichlorophenol (88-06-2)	625	2.0	4.0
BASE/NEUTRAL COMPOUNDS (compounds in bold are Ecology PBTs)			
Acenaphthene (83-32-9)	625	0.2	0.4
Acenaphthylene (208-96-8)	625	0.3	0.6
Anthracene (120-12-7)	625	0.3	0.6
Benzidine (92-87-5)	625	12	24
Benzyl butyl phthalate (85-68-7)	625	0.3	0.6
Benzo(*a*)anthracene (56-55-3)	625	0.3	0.6
Benzo(j)fluoranthene (205-82-3)	625	0.5	1.0
Benzo(r,s,t)pentaphene (189-55-9)	625	0.5	1.0
Benzo(*a*)pyrene (50-32-8)	610/625	0.5	1.0
3,4-benzofluoranthene (Benzo(b)fluoranthene) (205-99-2)	610/625	0.8	1.6
11,12-benzofluoranthene (Benzo(k)fluoranthene) (207-08-9)	610/625	0.8	1.6
Benzo(*ghi*)Perylene (191-24-2)	610/625	0.5	1.0
Bis(*2-chloroethoxy)*methane (111-91-1)	625	5.3	21.2
Bis(*2-chloroethyl*)ether (111-44-4)	611/625	0.3	1.0
Bis(*2-chloroisopropyl*)ether (39638-32-9)	625	0.3	0.6
Bis(*2-ethylhexyl*)phthalate (117-81-7)	625	0.1	0.5

4-Bromophenyl phenyl ether (101-55-3)	625	0.2	0.4
2-Chloronaphthalene (91-58-7)	625	0.3	0.6
4-Chlorophenyl phenyl ether (7005-72-3)	625	0.3	0.5
Chrysene (218-01-9)	610/625	0.3	0.6
Dibenzo (a,j)acridine (224-42-0)	610M/625M	2.5	10.0
Dibenzo (a,h)acridine (226-36-8)	610M/625M	2.5	10.0
Dibenzo(a-*h*)anthracene (53-70-3)(1,2,5,6-dibenzanthracene)	625	0.8	1.6
Dibenzo(a,e)pyrene (192-65-4)	610M/625M	2.5	10.0
Dibenzo(a,h)pyrene (189-64-0)	625M	2.5	10.0
3,3-Dichlorobenzidine (91-94-1)	605/625	0.5	1.0
Diethyl phthalate (84-66-2)	625	1.9	7.6
Dimethyl phthalate (131-11-3)	625	1.6	6.4
Di-n-butyl phthalate (84-74-2)	625	0.5	1.0
2,4-dinitrotoluene (121-14-2)	609/625	0.2	0.4
2,6-dinitrotoluene (606-20-2)	609/625	0.2	0.4
Di-n-octyl phthalate (117-84-0)	625	0.3	0.6
1,2-Diphenylhydrazine (*as Azobenzene*) (122-66-7)	1625B	5.0	20
Fluoranthene (206-44-0)	625	0.3	0.6
Fluorene (86-73-7)	625	0.3	0.6
Hexachlorobenzene (118-74-1)	612/625	0.3	0.6
Hexachlorobutadiene (87-68-3)	625	0.5	1.0
Hexachlorocyclopentadiene (77-47-4)	1625B/625	0.5	1.0
Hexachloroethane (67-72-1)	625	0.5	1.0
Indeno(*1,2,3-cd*)Pyrene (193-39-5)	610/625	0.5	1.0
Isophorone (78-59-1)	625	0.5	1.0
3-Methyl cholanthrene (56-49-5)	625	2.0	8.0
Naphthalene (91-20-3)	625	0.3	0.6
Nitrobenzene (98-95-3)	625	0.5	1.0
N-Nitrosodimethylamine (62-75-9)	607/625	2.0	4.0
N-Nitrosodi-n-propylamine (621-64-7)	607/625	0.5	1.0

N-Nitrosodiphenylamine (86-30-6)	625	0.5	1.0
Perylene (198-55-0)	625	1.9	7.6
Phenanthrene (85-01-8)	625	0.3	0.6
Pyrene (129-00-0)	625	0.3	0.6
1,2,4-Trichlorobenzene (120-82-1)	625	0.3	0.6
PESTICIDES/PCBs			
Aldrin (309-00-2)	608	0.025	0.05
alpha-BHC (319-84-6)	608	0.025	0.05
beta-BHC (319-85-7)	608	0.025	0.05
gamma-BHC (58-89-9)	608	0.025	0.05
delta-BHC (319-86-8)	608	0.025	0.05
Chlordane (57-74-9)	608	0.025	0.05
4,4'-DDT (50-29-3)	608	0.025	0.05
4,4'-DDE (72-55-9)	608	0.025	0.05[10]
4,4' DDD (72-54-8)	608	0.025	0.05
Dieldrin (60-57-1)	608	0.025	0.05
alpha-Endosulfan (959-98-8)	608	0.025	0.05
beta-Endosulfan (33213-65-9)	608	0.025	0.05
Endosulfan Sulfate (1031-07-8)	608	0.025	0.05
Endrin (72-20-8)	608	0.025	0.05
Endrin Aldehyde (7421-93-4)	608	0.025	0.05
Heptachlor (76-44-8)	608	0.025	0.05
Heptachlor Epoxide (1024-57-3)	608	0.025	0.05
PCB-1242 (53469-21-9)	608	0.25	0.5
PCB-1254 (11097-69-1)	608	0.25	0.5
PCB-1221 (11104-28-2)	608	0.25	0.5
PCB-1232 (11141-16-5)	608	0.25	0.5
PCB-1248 (12672-29-6)	608	0.25	0.5
PCB-1260 (11096-82-5)	608	0.13	0.5
PCB-1016 (12674-11-2)	608	0.13	0.5
Toxaphene (8001-35-2)	608	0.24	0.5

1. Detection level (DL) or detection limit means the minimum concentration of an analyte (substance) that can be measured and reported with a 99% confidence that the analyte concentration is greater than zero as determined by the procedure given in 40 CFR part 136, Appendix B.

2. Quantitation Level (QL) is equivalent to EPA's Minimum Level (ML) which is defined in 40 CFR Part 136 as the minimum level at which the entire GC/MS system must give recognizable mass spectra (background corrected) and acceptable calibration points. These levels were published as proposed in the Federal Register on March 28, 1997.

APPENDIX B

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
4601 N Monroe Street • Spokane, Washington 99205-1295 • (509)329-3400

February 1, 2013

Mr. Ahmad Qayoumi, P.E.
City of Pasco Public Works Director
PO Box 293
Pasco, WA 99301

Order:	Docket No. 9737
Site Location:	City of Pasco Public Works Department 525 North 3rd Avenue, Pasco, WA

Re: Administrative Order

Dear Mr. Qayoumi:

The Department of Ecology (Ecology) issues the enclosed Administrative Order (Order) requiring the City of Pasco (City) to comply with:

- Chapter 90.48 Revised Code of Washington (RCW) – Water Pollution Control.
- Chapter 173-208 Washington Administrative Code (WAC) – Grant of Authority Sewerage Systems.
- Chapter 173-240 Washington Administrative Code (WAC) -- Submission of plans and reports for construction of wastewater facilities.
- Chapter 40 CFR Part 403 General Pretreatment Standards and New Sources of Pollution.
- City of Pasco National Pollutant Discharge Elimination System Waste Discharge Permit No. WA-004496-2.
- City of Pasco State Waste Discharge Permit No. ST005369.

Chapter 90.48.120 (2) RCW gives Ecology the authority to issue Administrative Orders requiring compliance whenever it determines a person has violated or has potential to violate Chapter 90.48 RCW. This order starts the process of formally delegating pretreatment permitting and engineering review to the City of Pasco.

If you have any questions, please contact Scott Mallery at (509) 329-3473 or sma1461@ecy.wa.gov .

Sincerely,

James M. Bellatty

James M. Bellatty
Section Manager
Water Quality Program

JMB: SM:dw
Enclosures: Administrative Order Docket No. 9737
CERTIFIED MIAL: 7010 0290 0003 5679 2373
cc: Scott Mallery
Michael Hepp

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

IN THE MATTER OF AN ADMINISTRATIVE ORDER AGAINST: City of Pasco Ahmad Qayoumi	)))))	ADMINISTRATIVE ORDER DOCKET No. 9737

To: Ahmad Qayoumi, P.E.
City of Pasco Public Works Director
PO Box 293
Pasco, WA 99301

Order:	Docket No. 9737
Site Location	City of Pasco Public Works Department, Second Floor, 525 N. Third Ave., Pasco, WA 99301

The Department of Ecology (Ecology) issues this Administrative Order (Order) requiring City of Pasco to comply with:

- Chapter 90.48 Revised Code of Washington (RCW) – Water Pollution Control.
- Chapter 173-208 Washington Administrative Code (WAC) – Grant of Authority Sewerage Systems.
- Chapter 173-240 Washington Administrative Code (WAC) - Submission of plans and reports for construction of wastewater facilities.
- Chapter 40 CFR Part 403 General Pretreatment Standards and New Sources of Pollution.
- City of Pasco National Pollutant Discharge Elimination System Waste Discharge Permit No. WA-004496-2.
- City of Pasco State Waste Discharge Permit No. ST005369.

Chapter 90.48 120 92 RCW gives Ecology the authority to issue Administrative Orders requiring compliance whenever it determines that a person has violated Chapter 90.48 RCW.

DETERMINATION OF VIOLATION(s) AND ORDER TO COMPLY

Ecology's determination that a violation/violations has/have occurred is based on the violations listed below.

Violation(s) and associated corrective action(s):

Violation(s) description:

Chapter 40 C.F.R. Part 403.8 requires a Publicly Owned Treatment Works (POTWs) (or combination of POTWs operated by the same entity) with a total design flow of greater than 5 MGD and receiving wastewater from industrial users subject to pretreatment standards to establish a pretreatment program unless the state exercises its option to assume authority for pretreatment. Effective April 1, 2014, Ecology will no longer assume authority for pretreatment for the City of Pasco.

Corrective actions required:

For these reasons and in accordance with RCW 90.48.120(2) Ecology orders that the City of Pasco take the following actions. These actions are required at the location known as City of Pasco Public Works Department located at City of Pasco Public Works Department, 525 N. Third Ave., Pasco, WA 99301

On or before **April 1, 2014**, the City must implement an Industrial Pretreatment Program in accordance with the legal authorities, policies, procedures, and financial provisions described in a pretreatment program approved by Ecology.

The following pretreatment implementation activities must occur starting immediately:

A. <u>General Requirements</u>

1. The City must work with Ecology to ensure all commercial and industrial users of the POTWs comply with the pretreatment regulations promulgated in 40 CFR Part 403 and any additional regulations that may be promulgated under Section 307(b) (pretreatment) and 308 (reporting) of the Federal Clean Water Act.

2. This order requires the development of a program under which the City administers the Federal Pretreatment Program and State Waste discharge Permit program for control of discharges to the publicly owned municipal and industrial sewer from tributary industries. Section E through I contains a schedule of submittals related to pretreatment program development. Sections B, C. and D apply until program delegation. Upon delegation the City takes over implementation of the pretreatment program. The City must then submit copies of permits to Ecology upon issuance providing the basis for Ecology to terminate its permits for indirect discharges. Ecology updates the City's discharge permits to include conditions and requirements for the delegated systems.

B. Wastewater Discharge Permit Required

Until delegated, the City must not allow Significant Industrial Users (SIUs) to discharge wastewater to the City's sewerage system until such user receives a wastewater discharge permit from Ecology in accordance with Chapter 90.48 RCW and Chapter 173-216 WAC, as amended.

C. Identification and Reporting of Existing, New, and Proposed Industrial Users

1. The City must take continuous, routine measures to identify all existing, new, and proposed SIUs and Potential Significant Industrial Users (PSIUs) discharging or proposing to discharge to the City's sewerage system.

2. Within 30 days of becoming aware of an unpermitted existing, new, or proposed industrial user who may be an SIU, the City must notify such user by registered mail that, if classified as an SIU, they must apply to Ecology and obtain a State Waste Discharge Permit. A copy of this notification letter must also be sent to Ecology within this same 30-day period.

3. The City must also notify all PSIUs, as they are identified, that if their classification should change to an SIU, they must apply to Ecology for a State Waste Discharge Permit within 30 days of such change.

D. Duty to Enforce Discharge Prohibitions

1. In accordance with 40 CFR 403.5(a), the City must not authorize or knowingly allow the discharge of any pollutants into its POTWs which cause pass through or interference, or which otherwise violates general or specific discharge prohibitions contained in 40 CFR Part 403.5 or WAC-173-216-060.

2. The City must not authorize or knowingly allow the introduction of any of the following into their treatment works:

   a. Pollutants which create a fire or explosion hazard in the POTWs (including, but not limited to waste streams with a closed cup flashpoint of less than 140 degrees Fahrenheit or 60 degrees Centigrade using the test methods specified in 40 CFR 261.21).

   b. Industries with pollutants which cause corrosive structural damage to the POTWs must not discharges pH lower than 5.0 or greater than 11.0 standard units, unless the works are specifically designed to accommodate such discharges.

   c. Solid or viscous pollutants in amounts that could cause obstruction to the flow in sewers or otherwise interfere with the operation of the POTWs.

   d. Any pollutant, including oxygen demanding pollutants, (BOD, etc.) released in a discharge at a flow rate and/or pollutant concentration which will cause interference with the POTWs.

e. Petroleum oil, non-biodegradable cutting oil, or products of mineral origin in amounts that will cause interference or pass through.

f. Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity which may cause acute worker health and safety problems.

g. Heat in amounts that will inhibit biological activity in the POTWs resulting in interference but in no case heat in such quantities such that the temperature at the POTW headworks exceeds 40°C (104°F) unless Ecology, upon request of the City, approves in writing alternate temperature limits.

h. Any trucked or hauled pollutants, except at discharge points designated by the City.

i. Wastewaters prohibited to be discharged to the POTWs by the Dangerous Waste Regulations (Chapter 173-303 WAC), unless authorized under the Domestic Sewage Exclusion (WAC 173-303-071).

3. All of the following are prohibited from discharge to the POTWs unless approved in writing by Ecology under extraordinary circumstances (such as a lack of direct discharge alternatives due to combined sewer service or the need to augment sewage flows due to septic conditions):

   a. Noncontact cooling water in significant volumes.

   b. Stormwater and other direct inflow sources.

   c. Wastewaters significantly affecting system hydraulic loading, which do not require treatment, or would not be afforded a significant degree of treatment by the system.

4. The City must notify Ecology if any industrial user violates the prohibition listed in this section.

The following information must be submitted by the dates indicated in order to constitute a complete application for a pretreatment program delegation.

E. <u>Industrial User Survey</u>

The City must complete and submit to Ecology an Industrial User Survey listing all Sills and PSIUs discharging to the POTW. The survey must be received by the Water Quality Program at ERO by **June 1, 2013.** At a minimum, the list of SIUs and PSIUs must be developed by means of a telephone book search, a water utility billing records search, and a physical reconnaissance of the service area. Information on PSIUs must at least include: the business name, telephone number, address, description of the industrial process(es), and the known wastewater volumes and characteristics. For assistance with the development of the Industrial User Survey, the City must refer to Ecology's guidance document entitled "Performing an Industrial User Survey."

F. Local Limits Evaluation

1. Sampling to Determine Local Limits

   a. The City must analyze for the priority pollutants listed in Tables II and III of Appendix D of 40 CFR Part 122 as amended. Sampling must be conducted quarterly starting **1st Quarter 2013** for one year at both of the City's POTWs. Each quarter will have a minimum of two samples per quarter. Semiannual sampling must be conducted once during the wet season and once during the dry season, approximately six months apart.

   b. The influent and effluent must be sampled on days when industrial and commercial discharges are occurring at normal to maximum levels.

   c. Procedures listed in 40 CFR 136 must be used for collections, preservation, storage, and analysis of samples.

   d. Sludge

      1) Sludge samples must be taken as the sludge leaves the dewatering device or digesters before mixing with sludge of different ages.

      2) Sludge Reporting: Analytical results for sludge must be reported in mg/kg (dry weight)

e. The City must sample as described in Table 1.

Table 1: Local Limits Sampling			
Parameter	Sample Point	Sample Type	Minimum Number of Samples Per Sampling Event
Conventional Pollutants, Metals, Acid Compounds, Base/neutral and	Influent	24-hour Composite	Three discrete 24 hr. samples within a week (Mon-Fri) (2)(3)
Pesticides (1)	Effluent	24-hour Composite	Three discrete 24 hr. samples within a week (Mon-Fri)(2)(3)
	Sludge	Grab	Once, during the same time period influent and effluent samples are taken.
	Hauled Waste	Grab	Once, during the same time period that influent and effluent samples are taken (5)
Volatile Organics	Influent	Eight grab samples collected over 24-hours	Three 24 hr. samples within a week (Mon-Fri) (2)(4)
	Effluent	Eight grab samples collected over 24-hours	Three 24 hr. samples within a week (Mon-Fri) (2)(4)
	Sludge	Grab	Once, during the same time period influent and effluent samples are taken.
	Hauled Waste	Grab	Once, during the same time period influent and effluent samples are taken (5)

(1) Influent and effluent samples for cyanide must 'be collected and analyzed as required in paragraph F.1.g. 4).

(2) Sample days need not be contiguous.

(3) Each 24 hour composite sample must be analyzed and reported as a discrete sample.

(4) A single analysis for volatile pollutants may be run for each 24-hour monitoring day.

(See paragraph F.1.h. 2).

(5) Need to be sampled if considering to authorization of discharging hauled waste at the POTWs

f. Metals, Cyanide, Percent Solids

1) The City must sample influent, effluent, and sludge from its facility for arsenic, cadmium, chromium, copper, cyanide, lead, mercury, molybdenum, nickel, selenium, silver, and zinc. Sludge must also be analyzed and reported for percent solids.

2) Metals must be analyzed and reported as total metals.

3) For pretreatment sampling, the City must use EPA-approved analytical methods that achieve the method detection limits (MDLs) in Table 2, unless higher detection limits are approved by the Water Quality Program at the Eastern Regional Office (ERO). Requests for higher MDLs must be submitted in writing to the ERO Pretreatment Engineer at the address below.

4) Cyanide sampling: Influent and effluent sampling for cyanide must be conducted as follows. Eight discrete grab samples must be collected over a 24-hour day. Each grab sample must be at least 100 ml. Each sample must be checked for the presence of chlorine and/or sulfides prior to preserving and compositing (refer to Standard Methods, 4500-CN B).

Table 2: Method Detection Limits

Parameter	MDL, ug/l
Arsenic	1.0
Cadmium	0.2
Chromium	1.0
Copper	1.0
Cyanide	10.0 (1)
Lead	1.0
Mercury	0.1
Molybdenum	4.0
Nickel	1.0
Selenium	2.0
Silver	0.2
Zinc	4.0
Note: (1) This value represents a minimum level, not an MDL.	

g. Toxic Organics

1) The City must perform chemical analyses of its influent, effluent, and sludge for all specific toxic organic pollutants listed in Table II o f Appendix D of 40 CFR 122.

2) Volatile Organic Sampling: eight discrete samples must be collected over the 24 hour day using 40 ml VOC vials with Teflon septa. During sampling, the flow from the discharge will be controlled to produce smooth laminar flow to prevent agitation and aeration of the sample. The VOC vials will be filled to the top such that there is a meniscus present. There must be no visible air space or air bubbles in the VOC vials when capped. A single analysis for volatile pollutants may be run for each monitoring day by compositing equal volumes of the individual discrete VOC vials (at the analytical laboratory using extreme care not to introduce air/air bubbles) directly into the GC purge and trap apparatus, with no less than 1 ml of each grab included in the composite. The composite sample must be analyzed immediately.

3) In addition to priority pollutants, a reasonable attempt must be made to identify and quantify the ten most abundant substances of each fraction (excluding priority pollutants and un-substituted aliphatic compounds) shown to be present by peaks on the total ion plots (reconstructed gas chromatogram) more than ten times higher than the adjacent background noise which produces an identifiable spectra, and more than five scans wide. Identification must be attempted by a laboratory whose computer data processing programs are capable of comparing the sample mass spectrum to a computerized library of mass spectra, with visual confirmation by an experienced analyst. Quantification may be an order of magnitude estimate based on comparison with an internal standard.

4) Sample Handling: All samples must be prepared, preserved, shipped, and analyzed in accordance with USEPA Methods 624 and 625.

2. Local Limits Evaluation Requirements

a. **By June 1, 2013,** the City must submit a complete local limits evaluation to the Water Quality Program at ERO.

b. The evaluation must propose limits that protect water quality in the receiving stream, biological processes in the treatment plant, and sludge quality goals.

c. At a minimum, the evaluation must address fats, oils & grease, conventional pollutants (i.e. BOD and TS S), pH, TKN, and propose limits for each metal (above) and each priority pollutant listed in Tables II and III of Appendix D of 40 CFR Part 122 which has been observed to be entering the POTWs at levels of concern for pass through or interference.

d. The submittal must include proposed local limits, maximum allowable headworks loading, all supporting calculations, data from which calculations were based, and clear explanations of all assumptions.

e. The monitoring to support development of these local limitations must be conducted as required in section F.1.

f. For assistance with the development of Local Limits, the City must refer to Ecology's guidance document entitled, "Model Guidance Manual for Using NEWLL8.xls to Develop Local Discharge Limitations" and EPA's "Local Limits Development Guidance" dated July 2004.

g. The City can request for a waiver from Water Quality Program at ERO if their current local limits meet the requirements in sections F.1 and F.2.

G. Sewer Use Ordinance

The City must develop and adopt a sewer use ordinance according to the following schedule:

1. By **July 1, 2013**, the City must submit a proposed sewer use ordinance and evaluation of legal authority to the Water Quality Program at ERO.

   a. The ordinance must incorporate the local limits developed under paragraph S6.F and the general pretreatment requirements of 40 CFR 403.

   b. The evaluation of legal authority, as minimum, will be an evaluation by the City's attorney of the legal authorities to be used by the City to apply and enforce the requirements of Sections 307(b) and (c) and 402(b)(8) of the Clean Water Act, including those requirements outlined in 40 CFR 403.8(f)(1). The ability of the POTW's program to administer the program to any tributary industries outside (i.e. Port of Quincy) the City limits through adequate multijurisdictional agreements must also be addressed.

2. Within three months of approval of the proposed sewer use ordinance by the Water Quality Program at ERO, the City must codify the ordinance, incorporation with such modifications as required by Water Quality Program at ERO.

3. For assistance with the development of Sewer Use Ordinance, the City must refer to Ecology's guidance document entitled "Model Pretreatment Ordinance" and EPA's "Model Ordinance for Pretreatment".

4. The City can request for a waiver from the Water Quality Program at ERO if their current Sewer Use Ordinance meets the requirements in section F. Mercury Control Plan

The City must revise and submit to Ecology an updated Mercury abatement and control plan. The plan must be expanded as Ecology develops and releases further guidance. The Mercury Control Plan must be submitted to Ecology by **September 15, 2013**

Mercury Plan development guidance can be found at the following locations:

Ecology mercury web site	http ://www.ecy.wa. gov/mercury
For Dental Plan guidance	http://www. ecy.wa. gov/dentalbmps/index . html
Reduction plan guidance	http://www. ecy.wa. gov/biblio/0303001 . html

H. Program Procedures Manual

The City must develop and adopt a Program Procedures Manual (PPM) according to the following schedule:

1. By **September 15, 2013,** the City must submit a draft PPM to the Water Quality Program at ERO. The manual will contain, at a minimum, provisions implementing State Waste Discharge Permit program of Chapter 173-216 WAC, Plans for Pollution Control Facilities of Chapter 173-240 WAC, and the federal pretreatment program requirements of 40 CFR 403.

2. Upon Ecology's review and feedback, the City will resubmit the final PPM and address Ecology feedback by **November 1, 2013.**

3. At a minimum, the PPM will contain the following:

   a. An evaluation of the financial programs, staffing, and revenue sources, as required by 40 CFR 403.8(f)(3), required to implement the pretreatment program;

   b. Policies and procedures(e.g. locating industries, notification, engineering, permitting, inspection, data management, handling hauled waste, sampling, spill plan review, and enforcement—Enforcement Response Plan) needed to implement local, state, and federal pretreatment standards and requirements in particular those of 40 CFR 403.8 and 403.12;

   c. List of monitoring equipments required by the POTWs to implement the pretreatment program and a description of municipal facilities to be constructed or acquired for monitoring or analysis of industrial wastes; and,

   d. Procedures for submitting, reviewing, and approving Engineering Reports, Plans and Specifications, and Operational Manuals as outlined in WAC 173-240 for industrial facilities.

J. Schedule for Pretreatment Program Development

1. By **February 1, 2014**, the City must submit three copies of their Pretreatment Program to the Water Quality Program at ERO for approval in accordance with the general pretreatment regulations (40 CFR 403).

2. At a minimum, the pretreatment program must include the following:

   a. Results of an industrial waste survey (Industrial User Survey) as required by 40 CFR 403.8(f)(2)(i-iii), including identification of non-domestic users and the character and volume contributed to the POTWs by the non-domestic users and developed as required in paragraph E.

L. Reports and Information

All reports and information required to be submitted under this part must be submitted to the following addresses:

Department of Ecology, Eastern Regional Office
Water Quality Program
4601 N. Monroe Street
Spokane, WA 99205

SUMMARY OF NECESSARY SUBMITTAL DATES

Section	Submittal	Frequency	Submittal Due Date
E	Industrial User Survey	Once	June 1, 2013
F.1	Sampling to Determine Local Limits	Twice a quarter for four quarters in 2013	Begin 1st Quarter 2013
F.2.a	Submit Local Limits Evaluation	Once	June 1, 2013
G.1	Submit Proposed Sewer Use Ordinance	Once	July 1, 2013
H	Mercury Control Plan	Once	September 15, 2013
I.1	Submit draft Program Procedures Manual	Once	September 15, 2013
1.2	Submit Final Program Procedures Manual	Once	November 1, 2013
J.1	Submit Pretreatment Program	Once	February 1, 2014

ELIGIBILITY FOR PAPERWORK VIOLATION WAIVER AND OPPORTUNITY TO CORRECT

Under RCW 34.05.110, small businesses are eligible for a waiver of a first-time paperwork violation and an opportunity to correct other violations. We have made no determination as to whether you meet the definition of a "small business" under this section. However, we have determined that the requirements of RCW 34.05.110 do not apply to the violation(s) due to a conflict with federal law or program requirements, including federal requirements that are a prescribed condition to the allocation of federal funds to the state.

FAILURE TO COMPLY WITH THIS ORDER

Failure to comply with this Order may result in the issuance of civil penalties or other actions, whether administrative or judicial, to enforce the terms of this Order.

YOUR RIGHT TO APPEAL

You have a right to appeal this Order to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of this Order. The appeal process is governed by Chapter 43.21B RCW and Chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

b. Local limits for pollutants, developed as required in section F.2.

c. The City's sewer use ordinance, developed as required in section G.

d. An evaluation by the City's attorney of the legal authorities used by the City to apply and enforce the requirements of Sections 307(b) and (c) and 402(b)(8) of the Clean Water Act, including those requirements outline in 40 CFR 403.8(f)(1). The City must address multijurisdictional issues as required in paragraph G.

e. An evaluation of the financial programs, staffing, and revenue sources, as required by 40 CFR 403.8(f)(3) and paragraph I, employed to implement the pretreatment program.

f. Policies and procedures (e.g. permitting, inspections, compliance and enforcement—Enforcement Response Plan), required to implement the Chapter 40 CFR 403 and in particular those requirements in 40 CFR 403.8 and 403.12 and as required by section I.

g. List of monitoring equipment required by the POTWs to implement the pretreatment program and a description of municipal facilities to be constructed or acquired for monitoring or analysis of industrial wastes and as required by sections F. and I.

h. Copy of any statutes, ordinances, regulations, agreements, or other authorities relied upon by POTWs for City's administration of their Pretreatment Program.

i. Mercury Control Plan and as required by section H.

j. Procedures for submitting, reviewing, and approving Engineering Reports, Plans and specifications, and Operational Manuals as outlined in Chapter WAC 173240 for industrial facilities.

K. Continuing Monitoring for Pollutants of Concern

1. Following the completion of the local limit sampling required under Section F, the City must continue to monitor for pollutants of concern identified in the local limits evaluation on a semi-annual basis. Sampling events must be once during the wet season and once during the dry season, approximately six months apart.

2. The influent and effluent must be sampled on days when industrial and commercial discharges are occurring at normal to maximum levels.

3. The City must sample as described in Sections F.3 through F.6 above.

To appeal you must do both of the following within 30 days of the date of receipt of this Order:

- File your appeal and a copy of this Order with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.
- Serve a copy of your appeal and this Order on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

You must also comply with other applicable requirements in Chapter 43.21B RCW and Chapter 371-08 WAC.

Your appeal alone will not stay the effectiveness of this Order. Stay requests must be submitted in accordance with RCW 43.21B.320.

ADDRESS AND LOCATION INFORMATION

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503	**Department of Ecology** Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608
Pollution Control Hearings Board 1111 Israel Road SW STE 301 Tumwater, WA 98501	**Pollution Control Hearings Board** PO Box 40903 Olympia, WA 98504-0903

CONTACT INFORMATION

Please direct all questions about this Order to:

Department of Ecology
ATTN: Scott Mallery
4601 North Monroe
Spokane, WA 99205

Phone: (509) 329-3473
Email: sma1461@ecy.wa.gov

MORE INFORMATION

- Pollution Control Hearings Board Website: www.eho.wa.gov/Boards_PCHB.aspx
- Chapter 43.21B RCW - Environmental and Land Use Hearings Office – Pollution Control Hearings Board: http://apps.leg.wa.gov/RCW/default.aspx?cite=43.21B
- Chapter 371-08 WAC – Practice And Procedure: http://apps.leg.wa.gov/WAC/default.aspx?cite=371-08
- Chapter 34.05 RCW – Administrative Procedure Act: http://apps.leg.wa.gov/RCW/default.aspx?cite=34.05
- Laws: www.ecy.wa.gov/laws-rules/ecyrcw.html
- Rules: www.ecy.wa.gov/laws-rules/ecywac.html

SIGNATURE

James M. Bellatty   2/1/13

James M. Bellatty
Water Quality Section Manager
Department of Ecology
Eastern Regional Office

Date

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
4601 N Monroe Street • Spokane, Washington 99205-1295 • (509)329-3400

October 2, 2013

Mr. Ahmad Qayoumi, P.E.
City of Pasco Public Works Director
PO Box 293
Pasco, WA 99301

Amended Order Docket #	10241
Order Docket #	9737

Re: Amended Administrative Order

Dear Mr. Qayoumi:

The Department of Ecology (Ecology) has issued the enclosed amended Administrative Order (Order) requiring the City of Pasco (City) to comply with:

- Chapter 90.48 Revised Code of Washington (RCW) – Water Pollution Control
- Chapter 173-208 Washington Administrative Code (WAC) – Grant of Authority Sewerage Systems
- Chapter 173-240 Washington Administrative Code (WAC) -- Submission of plans and reports for construction of wastewater facilities
- Chapter 40 CFR Part 403 General Pretreatment Standards and New Sources of Pollution
- City of Pasco National Pollutant Discharge Elimination System Waste Discharge Permit No. WA-004496-2
- City of Pasco State Waste Discharge Permit No. ST005369.

This Order Amendment changes the schedule dates in Order #9737 per your July 22, 2013 request. If you have questions please contact Scott Mallery at (509) 329-3473 or smal461@ecy.wa.gov.

Sincerely,

James M. Bellatty

James M Bellatty
Section Manager
Water Quality Program
Eastern Regional Office

CERTIFIED MAIL 7010 0290 0003 5679 0584

JMB:MH:red
Enclosure: Amended Administrative Order Docket #10241

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

IN THE MATTER OF AN ADMENDED ADMINISTRATIVE ORDER AGAINST City of Pasco Ahmad Qayoumi	)))	AMENDED ADMINISTRATIVE ORDER DOCKET#10241 ADMINISTRATIVE ORDER DOCKET #9737

To: Ahmad Qayoumi, P.E.
City of Pasco Public Works Director
PO Box 293
Pasco, WA 99301

Amended Order Docket #	10241
Order Docket #	9737

The Department of Ecology (Ecology) has issued this amended Administrative Order (Order) Docket #10241 to amend Order Docket #9737 dated February 1, 2013 issued to the City of Pasco.

This Order Amendment describes the corrective actions required at the location known as the City of Pasco Public Works Department located at 525 North 3rd Avenue, Pasco, WA. This Order Amendment changes the schedule dates in Order#9737 per your July 22, 2013 request.

ADMINISTRATIVE ORDER AMENDMENTS

Ecology's determination that a violation/violations has/have occurred is based on the violations listed below.

Violation(s) and associated corrective action(s):

Violation(s) description:

Chapter 40 C.F.R. § Part 403.8 requires a Publicly Owned Treatment Works (POTWs) (or combination of POTWs operated by the same entity) with a total design flow of greater than 5 MGD and receiving wastewater from industrial users subject to pretreatment standards to establish a pretreatment program unless the state exercises its option to assume authority for pretreatment. Effective January 1, 2015, Pasco needs to take authority for their pretreatment program because on that date Ecology will no longer assume authority for pretreatment for the City.

Corrective actions required:

For these reasons and in accordance with RCW 90.48.120(2) Ecology orders that the City of Pasco take the following actions. Ecology requires these actions at the location known as City of Pasco Public Works Department located at525 N. Third Ave., Pasco, WA 99301. Ecology revised the submittal dates in Order #9737 to those in this Order per the DATE request of the City of Pasco.

On or before **January 1, 2015**, the City must implement an Industrial Pretreatment Program in accordance with the legal authorities, policies, procedures, and financial provisions described in a pretreatment program approved by Ecology.

The following pretreatment implementation activities must occur starting immediately:

A. General Requirements

1. The City must work with Ecology to ensure all commercial and industrial users of the POTWs comply with the pretreatment regulations promulgated in 40 CFR Part 403 and any additional regulations that may be promulgated under Section 307(b) (pretreatment) and 308 (reporting) of the Federal Clean Water Act.

2. This order requires the development of a program under which the City administers the Federal Pretreatment Program and State Waste Discharge Permit program for control of discharges to the publicly owned municipal and industrial sewer from tributary industries. Section E through I contains a schedule of submittals related to pretreatment program development. Sections B, C, and D apply until program delegation. Upon delegation the City takes over implementation of the pretreatment program. The City must then submit copies of permits to Ecology upon issuance providing the basis for Ecology to terminate its permits for indirect discharges. Ecology updates the Cities discharge permits to include conditions and requirements for the delegated systems.

B. Wastewater Discharge Permit Required

Until delegated, the City must not allow Significant Industrial Users (SIUs) to discharge wastewater to the City's sewerage system until such user receive a wastewater discharge permit from Ecology in accordance with Chapter 90.48 RCW and Chapter 173-216 WAC, as amended.

C. Identification and Reporting of Existing, New, and Proposed Industrial Users

1. The City must take continuous, routine measures to identify all existing, new, and proposed SIUs and Potential Significant Industrial Users (PSIUs) discharging or proposing to discharge to the City's sewerage system.
2. Within 30 days of becoming aware of an unpermitted existing, new, or proposed industrial user who may be an SIU, the City must notify such user by registered mail that, if classified as an SIU, they must apply to Ecology and obtain a State Waste Discharge Permit. A copy of this notification letter must also be sent to Ecology within this same 30-day period.
3. The City must also notify all PSIUs, as identified, that if their classification should

change to an SIU, they must apply to Ecology for a State Waste Discharge Permit within 30 days of such change.

D. Duty to Enforce Discharge Prohibitions

1. In accordance with 40 CFR 403.5(a), the City must not authorize or knowingly allow the discharge of any pollutants into its POTWs which cause pass through or interference, or which otherwise violates general or specific discharge prohibitions contained in 40 CFR Part 403.5 or WAC-173-216-060.

2. The City must not authorize or knowingly allow the introduction of any of the following into their treatment works:

   a. Pollutants which create a fire or explosion hazard in the POTWs (including, but not limited to waste streams with a closed cup flashpoint of less than 140 degrees Fahrenheit or 60 degrees Centigrade using the test methods specified in 40 CFR 261.21).

   b. Industries with pollutants which cause corrosive structural damage to the POTWs, must not discharges pH lower than 5.0, or greater than 11.0 standard units, unless the works are specifically designed to accommodate such discharges.

   c. Solid or viscous pollutants in amounts that could cause obstruction to the flow in sewers or otherwise interfere with the operation of the POTWs.

   d. Any pollutant, including oxygen demanding pollutants, (BOD, etc.) released in a discharge at a flow rate and/or pollutant concentration which will cause interference with the POTWs.

   d. Petroleum oil, non-biodegradable cutting oil, or products of mineral origin in amounts that will cause interference or pass through.

   e. Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity which may cause acute worker health and safety problems.

   f. Heat in amounts that will inhibit biological activity in the POTWs resulting in interference but in no case heat in such quantities such that the temperature at the POTW headworks exceeds 40°C (104°F) unless Ecology, upon request of the City, approves, in writing, alternate temperature limits.

   g. Any trucked or hauled pollutants, except at discharge points designated by the City.

   h. Wastewaters prohibited to be discharged to the POTWs by the Dangerous Waste Regulations (Chapter 173-303 WAC), unless authorized under the Domestic Sewage Exclusion (WAC 173-303-071).

3. All of the following are prohibited from discharge to the POTWs unless approved in writing by Ecology under extraordinary circumstances (such as a lack of direct discharge alternatives due to combined sewer service or the need to augment sewage flows due to septic conditions):

   a. Noncontact cooling water in significant volumes.

b. Stormwater and other direct inflow sources.

c. Wastewaters significantly affecting system hydraulic loading, which do not require treatment, or would not be afforded a significant degree of treatment by the system.

4. The City must notify Ecology if any industrial user violates the prohibition listed in this section.

The following information must be submitted by the dates indicated in order to constitute a complete application for a pretreatment program delegation.

E. Industrial User Survey

The City must complete and submit to Ecology an Industrial User Survey listing all Sills and PSIUs discharging to the POTW. The survey must be received by the Water Quality Program at ERO by **March 1, 2014.** At a minimum, the list of SIUs and PSIUs must be developed by means of a telephone book search, a water utility billing records search, and a physical reconnaissance of the service area. Information on PSIUs must at least include: the business name; telephone number; address; description of the industrial process(es); and, the known wastewater volumes and characteristics. For assistance with the development of the Industrial User Survey, the City must refer to Ecology's guidance document entitled "Performing an Industrial User Survey."

F. Local Limits Evaluation

1. Sampling to Determine Local Limits

a. The City must analyze for the priority pollutants listed in Tables II and III of Appendix D of 40 CFR Part 122 as amended. The City must conduct sampling quarterly starting **4th Quarter 2013** (October-December) for one year at both of the City's POTWs. Each quarter will have a minimum of two samples per quarter. The City must conduct semiannual sampling once during the wet season and once during the dry season, approximately six months apart.

b. The City must sample the influent and effluent on days when industrial and commercial discharges occur at normal to maximum levels.

c. The City must use the procedures listed in 40 CFR 136 for collections, preservation, storage, and analysis of samples.

d. Sludge

1) The City must take sludge samples as the sludge leaves the dewatering device or digesters before mixing with sludge of different ages.

2) The City must report sludge analytical results in mg/kg (dry weight)

e. The City must sample as described in Table 1.

Table 1: Local Limits Sampling

Parameter	Sample Point	Sample Type	Minimum Number of Samples Per Sampling Event
Conventional Pollutants, Metals, Acid Compounds, Base/neutral and Pesticides (1)	Influent	24-hour Composite	Three discrete 24-hour samples within a week (Mon-Fri) (2)(3)
	Effluent	24-hour Composite	Three discrete 24-hour samples within a week (Mon-Fri) (2)(3)
	Sludge	Grab	Once, during the same time period influent and effluent samples are taken.
	Hauled Waste	Grab	Once, during the same time period that influent and effluent samples are taken (5)
Volatile Organics	Influent	Eight grab samples collected over 24-hours	Three 24-hour samples within a week (Mon-Fri) (2)(4)
	Effluent	Eight grab samples collected over 24-hours	Three 24-hour samples within a week (Mon-Fri) (2)(4)
	Sludge	Grab	Once, during the same time period influent and effluent samples are taken.
	Hauled Waste	Grab	Once, during the same time period influent and effluent samples are taken (5)

Note:
(1) Influent and effluent samples for cyanide must 'be collected and analyzed as required in paragraph F.1.g. 4).
(2) Sample days need not be contiguous.
(3) Each 24 hour composite sample must be analyzed and reported as a discrete sample.
(4) A single analysis for volatile pollutants may be run for each 24-hour monitoring day.

(See paragraph F.1.h. 2).
(5) Need to be sampled if considering to authorization of discharging hauled waste at the POTWs

f. Metals, Cyanide, Percent Solids

1). The City must sample influent, effluent, and sludge from its facility for arsenic, cadmium, chromium, copper, cyanide, lead, mercury, molybdenum, nickel, selenium, silver, and zinc and report percent solids for the sludge.

2). The City must analyze and report Metals as total metals.

3). For pretreatment sampling, the City must use EPA-approved analytical methods that achieve the method detection limits (MDLs) in Table 2, unless higher detection limits are approved by the Water Quality Program at the Eastern Regional Office (ERO). Requests for higher MDLs must be submitted in writing to the ERO Pretreatment Engineer at the address below.

4). Cyanide sampling: Influent and effluent sampling for cyanide must be conducted as follows. Eight discrete grab samples must be collected over a 24-hour day. Each grab sample must be at least 100 ml. Each sample must be checked for the presence of chlorine and/or sulfides prior to preserving and compositing (refer to Standard Methods, 4500-CN B).

Table 2: Method Detection Limits

Parameter	MDL, ug/l
Arsenic	1.0
Cadmium	0.2
Chromium	1.0
Copper	1.0
Cyanide	10.0 (1)
Lead	1.0
Mercury	0.1
Molybdenum	4.0
Nickel	1.0
Selenium	2.0
Silver	0.2
Zinc	4.0

Note:
(1) This value represents a minimum level, not an MDL.

g. Toxic Organics

1) The City must perform chemical analyses of its influent, effluent, and sludge for all specific toxic organic pollutants listed in Table II o f Appendix D of 40 CFR 122.

2) Volatile Organic Sampling: eight discrete samples must be collected over the 24 hour day using 40 ml VOC vials with Teflon septa. During sampling, the flow from the discharge will be controlled to produce smooth laminar flow to prevent agitation and aeration of the sample. The VOC vials will be filled to the top such that there is a meniscus present. There must be no visible air space or air bubbles in the VOC vials when capped. A single analysis for volatile pollutants may be run for each monitoring day by compositing equal volumes of the individual discrete VOC vials (at the analytical laboratory using extreme care not to introduce air/air bubbles) directly into the GC purge and trap apparatus, with no less than 1 ml of each grab included in the composite. The composite sample must be analyzed immediately.

3) In addition to priority pollutants, a reasonable attempt must be made to identify and quantify the ten most abundant substances of each fraction (excluding priority pollutants and un-substituted aliphatic compounds) shown to be present by peaks on the total ion plots (reconstructed gas chromatogram) more than ten times higher than the adjacent background noise which produces an identifiable spectra, and more than five scans wide. Identification must be attempted by a laboratory whose computer data processing programs are capable of comparing the sample mass spectrum to a computerized library of mass spectra, with visual confirmation by an experienced analyst. Quantification may be an order of magnitude estimate based on comparison with an internal standard.

4) Sample Handling: All samples must be prepared, preserved, shipped, and analyzed in accordance with USEPA Methods 624 and 625.

2. Local Limits Evaluation Requirements

a. **By June 1, 2014,** the City must submit a complete local limits evaluation to the Water Quality Program at ERO.

b. The evaluation must propose limits that protect water quality in the receiving stream, biological processes in the treatment plant, and sludge quality goals.

c. At a minimum, the evaluation must address fats, oils & grease, conventional pollutants (i.e. BOD and TS S), pH, TKN, and propose limits for each metal (above) and each priority pollutant listed in Tables II and III of Appendix D of 40 CFR Part 122 which has been observed to be entering the POTWs at levels of concern for pass through or interference.

d. The submittal must include proposed local limits, maximum allowable headworks loading, all supporting calculations, data from which calculations were based, and clear explanations of all assumptions.

e. The monitoring to support development of these local limitations must be conducted as required in section F.1.

f. For assistance with the development of Local Limits, the City must refer to Ecology's guidance document entitled, "Model Guidance Manual for Using NEWLL8.xls to Develop Local Discharge Limitations" and EPA's "Local Limits Development Guidance" dated July 2004.

g. The City can request for a waiver from Water Quality Program at ERO if their current local limits meet the requirements in sections F.1 and F.2.

G. Sewer Use Ordinance

The City must develop and adopt a sewer use ordinance according to the following schedule:

1. By **April 1, 2014**, the City must submit a proposed sewer use ordinance and evaluation of legal authority to the Water Quality Program at ERO.

   a. The ordinance must incorporate the local limits developed under paragraph S6.F and the general pretreatment requirements of 40 CFR 403.

   b. The evaluation of legal authority, as minimum, will be an evaluation by the City's attorney of the legal authorities to be used by the City to apply and enforce the requirements of Sections 307(b) and (c) and 402(b)(8) of the Clean Water Act, including those requirements outlined in 40 CFR 403.8(f)(1). The ability of the POTW's program to administer the program to any tributary industries outside (i.e. Port of Quincy) the City limits through adequate multijurisdictional agreements must also be addressed.

2. Within three months of approval of the proposed sewer use ordinance by the Water Quality Program at ERO, the City must codify the ordinance, incorporation with such modifications as required by Water Quality Program at ERO.

3. For assistance with the development of Sewer Use Ordinance, the City must refer to Ecology's guidance document entitled, "Model Pretreatment Ordinance" and EPA's "Model Ordinance for Pretreatment".

4. The City can request for a waiver from the Water Quality Program at ERO if their current Sewer Use Ordinance meets the requirements in section G.1.a and b.

H. Mercury Control Plan

The City must revise and submit to Ecology an updated Mercury abatement and control plan. The plan must be expanded as Ecology develops and releases further guidance. The Mercury Control Plan must be submitted to Ecology by **June 1, 2014**

Mercury Plan development guidance can be found at the following locations:

Ecology mercury web site	http ://www.ecy.wa. gov/mercury/
For Dental Plan guidance	http://www. ecy.wa. gov/dentalbmps/index. html
Reduction plan guidance	http://www. ecy.wa. gov/biblio/0303001. html

I. Program Procedures Manual

The City must develop and adopt a Program Procedures Manual (PPM) according to the following schedule:

1. By **June 1, 2014,** the City must submit a draft PPM to the Water Quality Program at ERO. The manual will contain, at a minimum, provisions implementing State Waste Discharge Permit program of Chapter 173-216 WAC, Plans for Pollution Control Facilities of Chapter 173-240 WAC, and the federal pretreatment program requirements of 40 CFR 403.
2. Upon Ecology's review and feedback, the City will resubmit the final PPM and addresses Ecology feedback by **August 1, 2014.**
3. At a minimum, the PPM will contain the following:
   a. An evaluation of the financial programs, staffing, and revenue sources, as required by 40 CFR 403.8(f)(3), required to implement the pretreatment program;
   b. Policies and procedures(e.g. locating industries, notification, engineering, permitting, inspection, data management, handling hauled waste, sampling, spill plan review, and enforcement—Enforcement Response Plan), needed to implement local, state, and federal pretreatment standards and requirements in particular those of 40 CFR 403.8 and 403.12;
   c. List of monitoring equipment required by the POTWs to implement the pretreatment program and a description of municipal facilities to be constructed or acquired for monitoring or analysis of industrial wastes; and,
   d. Procedures for submitting, reviewing, and approving Engineering Reports, Plans and Specifications, and Operational Manuals as outlined in WAC 173-240 for industrial facilities.

J. Schedule for Pretreatment Program Development

1. By **November 1, 2014**, the City must submit three copies of their Pretreatment Program to the Water Quality Program at ERO for approval in accordance with the general pretreatment regulations (40 CFR 403).
2. At a minimum, the pretreatment program must include the following:
   a. Results of an industrial waste survey (Industrial User Survey) as required by 40 CFR 403.8(f)(2)(i-iii), including identification of non-domestic users and

the character and volume contributed to the POTWs by the non-domestic users and developed as required in paragraph E.;

b. Local limits for pollutants, developed as required in section F.2;

c. The City's sewer use ordinance, developed as required in section G;

d. An evaluation by the City's attorney of the legal authorities used by the City to apply and enforce the requirements of Sections 307(b) and (c) and 402(b)(8) of the Clean Water Act, including those requirements outline in 40 CFR 403.8(f)(1). The City must address multijurisdictional issues as required in paragraph G;

e. An evaluation of the financial programs, staffing, and revenue sources, as required by 40 CFR 403.8(f)(3) and paragraph I, employed to implement the pretreatment program;

f. Policies and procedures (e.g. permitting, inspections, compliance and enforcement—Enforcement Response Plan), required to implement the Chapter 40 CFR 403 and in particular those requirements in 40 CFR 403.8 and 403.12 and as required by section I;

g. List of monitoring equipment required by the POTWs to implement the pretreatment program and a description of municipal facilities to be constructed or acquired for monitoring or analysis of industrial wastes and as required by sections F. and I;

h. Copy of any statutes, ordinances, regulations, agreements, or other authorities relied upon by POTWs for City's administration of their Pretreatment Program;

i. Mercury Control Plan and as required by section H; and,

j. Procedures for submitting, reviewing, and approving Engineering Reports, Plans and specifications, and Operational Manuals as outlined in Chapter WAC 173240 for industrial facilities.

K. Continuing Monitoring for Pollutants of Concern

1. Following the completion of the local limit sampling required under Section F, the City must continue to monitor for pollutants of concern identified in the local limits evaluation on a semi-annual basis. Sampling events must be once during the wet season and once during the dry season, approximately six months apart.
2. The influent and effluent must be sampled on days when industrial and commercial discharges are occurring at normal to maximum levels.
3. The City must sample as described in Sections F.3 through F.6 above.

L. Reports and Information

All reports and information required to be submitted under this part must be submitted to the following addresses:

Original: Pretreatment Engineer
Department of Ecology, Eastern Regional Office
Water Quality Program
4601 N. Monroe Street
Spokane, WA 99205

SUMMARY OF NECESSARY SUBMITTAL DATES

Section	Submittal	Frequency	Submittal Due Date
E	Industrial User Survey	Once	March 1, 2014
F.1	Sampling to Determine Local Limits	Twice a quarter for four quarters in 2013	Begin 4th Quarter 2013
F.2.a	Submit Local Limits Evaluation	Once	June 1, 2014
G.1	Submit Proposed Sewer Use Ordinance	Once	April 1, 2014
H.	Mercury Control Plan	Once	June 1, 2014
I.1	Submit draft Program Procedures Manual	Once	June 1, 2014
I.2	Submit Final Program Procedures Manual	Once	August 1, 2014
J.1	Submit Pretreatment Program	Once	November 1, 2014

No other condition or requirement of Order Docket #9737 is hereby affected by this amendment.

ELIGIBILITY FOR PAPERWORK VIOLATION WAIVER AND OPPORTUNITY TO CORRECT

Under RCW 34.05.110, small businesses are eligible for a waiver of a first-time paperwork violation and an opportunity to correct other violations. We have made no determination as to whether you meet the definition of a "small business" under this section. However, we have determined that the requirements of RCW 34.05.110 do not apply to the violation(s) due to a conflict with federal law or program requirements, including federal requirements that are a prescribed condition to the allocation of federal funds to the state.

FAILURE TO COMPLY WITH THIS ORDER

Failure to comply with this Order may result in the issuance of civil penalties or other actions, whether administrative or judicial, to enforce the terms of this Order.

YOUR RIGHT TO APPEAL

You have a right to appeal this Order to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of this Order. The appeal process is governed by Chapter 43.21B RCW and Chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal you must do both of the following within 30 days of the date of receipt of this Order:

- File your appeal and a copy of this Order with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.
- Serve a copy of your appeal and this Order on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

You must also comply with other applicable requirements in Chapter 43.21B RCW and Chapter 371-08 WAC.

Your appeal alone will not stay the effectiveness of this Order. Stay requests must be submitted in accordance with RCW 43.21B.320.

ADDRESS AND LOCATION INFORMATION

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503	**Department of Ecology** Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608
Pollution Control Hearings Board 1111 Israel Road SW STE 301 Tumwater, WA 98501	**Pollution Control Hearings Board** PO Box 40903 Olympia, WA 98504-0903

CONTACT INFORMATION

Please direct all questions about this Order to:

Scott Mallery
Department of Ecology
Eastern Regional Office
4601 North Monroe
Spokane, WA 99205
Phone: (509) 329-3473
Email: sma1461@ecy.wa.gov

MORE INFORMATION

Pollution Control Hearings Board Website
www.eho.wa.gov/Boards_PCHB.aspx

Chapter 43.21B RCW - Environmental and Land Use Hearings Office – Pollution Control Hearings Board
http://apps.leg.wa.gov/RCW/default.aspx?cite=43.21B

Chapter 371-08 WAC – Practice and Procedure
http://apps.leg.wa.gov/WAC/default.aspx?cite=371-08

Chapter 34.05 RCW – Administrative Procedure Act
http://apps.leg.wa.gov/RCW/default.aspx?cite=34.05

Laws: www.ecy.wa.gov/laws-rules/ecyrcw.html

Rules: www.ecy.wa.gov/laws-rules/ecywac.html

SIGNATURE

James M. Bellatty
James M. Bellatty
Water Quality Section Manager
Department of Ecology
Eastern Regional Office

10/2/13
Date

MSA

APPENDIX C

MSA
Murray, Smith & Associates, Inc.
Engineers/Planners

Probable Project Cost
Pasco Comprehensive Sewer System Plan - Capitol Avenue Lift Station

Project: Pasco Comprehensive Sewer System Plan
Submittal: Capitol Avenue Lift Station
Owner: City of Pasco, Washington
Project No.: 11-1261
Date: January 21,2013

Item No.	Item	Quantity		Unit Costs			Total Cost
				Material	Labor/Equipment (L/E)	Total	
Lift Station - Capital							
A1	Package PS	1	LS			$259,307.77	$259,308
A2	Miscellaneous Site Improvement	1	LS			$100,000.00	$100,000
A3	Electrical and Controls	1	LS			$50,000.00	$50,000
A4							
				SubTotal:			**$409,308**

Assumptions: RSMeans Packege Uility Lift Station
Land Acquisition is not included

Material & Labor Total:		**$409,308**
Contractors Overhead and Profit:	15%	$61,396
Mobilization:	10%	$40,931
Subtotal:		**$511,635**
Sales Tax:	8.6%	$44,001
Subtotal:		**$555,635**
Contingency:	30%	$166,691
Subtotal (Estimated Construction Cost):		**$722,326**
Engineering:	20%	$144,465
Legal and Administration:	10%	$72,233
Total Estimated Project Cost:		**$939,000**

MSA
Murray, Smith & Associates, Inc.
Engineers/Planners

Probable Project Cost
Pasco Comprehensive Sewer System Plan - Maitland Lift Station

Project: Pasco Comprehensive Sewer System Plan
Submittal: Maitland Lift Station
Owner: City of Pasco, Washington
Project No.: 11-1261
Date: January 21, 2013

Item No.	Item	Quantity		Unit Costs			Total Cost
				Material	Labor/Equipment (L/E)	Total	
Lift Station							
A1	Miscellaneous Improvements	1	LS			$10,000.00	$10,000
A2	Miscellaneous Piping Adjustments (valves, connection to discharge, etc.)	1	LS			$10,000.00	$10,000
A3	Future Pump - 50 hp	1	LS	$19,638.67	$4,909.67	$24,548.34	$24,548
A4	Electrical Upgrades	1	LS			$10,000.00	$10,000
A5	Controls Upgrades	1	LS			$9,000.00	
				SubTotal:			**$54,548**

Assumptions: Well house and wet well structure are not significantly changed
Ability to isolate individual pump with existing isolation valves (significant bypass pumping not required)
Update instruments (flow monitoring and level sensor equipment)

Material & Labor Total:		**$54,548**
Contractors Overhead and Profit:	15%	$8,182
Mobilization:	10%	$5,455
Subtotal:		**$68,185**
Sales Tax:	8.6%	$5,864
Subtotal:		**$74,049**
Contingency:	30%	$22,215
Subtotal (Estimated Construction Cost):		**$96,264**
Engineering:	20%	$19,253
Legal and Administration:	10%	$9,626
Total Estimated Project Cost:		**$125,000**

MSA
Murray, Smith & Associates, Inc.
Engineers/Planners

Probable Project Cost
Pasco Comprehensive Sewer System Plan - Ninth and Washington Lift Station - Phase 1

Project: Pasco Comprehensive Sewer System Plan
Submittal: Ninth and Washington Lift Station - Phase 1
Owner: City of Pasco, Washington
Project No.: 11-1261
Date: January 21, 2013

Item No.	Item	Quantity		Unit Costs			Total Cost
				Material	Labor/Equipment (L/E)	Total	
Lift Station							
A1	Miscellaneous Piping Adjustments (valves, connection to discharge, etc.)	1	LS			$20,000.00	$20,000
A2	Electrical Upgrades	1	LS			$20,000.00	$20,000
A3	50 hp	1	EA	$19,638.67	$4,909.67	$24,548.34	$24,548
A4	50 hp	1	EA	$19,638.67	$4,909.67	$24,548.34	$24,548
A5	Replace VFD (CIP Wishlist 6)	1	LS	$9,033.79	$1,806.76	$10,840.55	$10,841
A6	Roof Access Ladder (CIP Wishlist 15)	1	LS			$25,000.00	$25,000
A7	Improve Drywell Access and Remove Elevator	1	LS			$40,000.00	$40,000
A8	Removed Odor Control Equipment	1	LS			$10,000.00	$10,000
A9	Replace Valves - 12 inch	8	EA			$15,000.00	$120,000
A10							
A11							
				SubTotal:			**$294,937**

Assumptions: Well house and wet well structure are not significantly changed
Ability to isolate individual pump with existing isolation valves (significant bypass pumping not required)
Update instruments (flow monitoring and level sensor equipment)

Material & Labor Total:		**$294,937**
Contractors Overhead and Profit:	15%	$44,241
Mobilization:	10%	$29,494
Subtotal:		**$368,672**
Sales Tax:	9%	$31,706
Subtotal:		**$400,377**
Contingency:	30%	$120,113
Subtotal (Estimated Construction Cost):		**$520,490**
Engineering:	20%	$104,098
Legal and Administration:	10%	$52,049
Total Estimated Project Cost:		**$677,000**

Murray, Smith & Associates, Inc.
Engineers/Planners

Probable Project Cost

Pasco Comprehensive Sewer System Plan - Ninth and Washington Lift Station - Phase 2

Project: Pasco Comprehensive Sewer System Plan
Submittal: Ninth and Washington Lift Station - Phase 2
Owner: City of Pasco, Washington
Project No.: 11-1261
Date: January 21, 2013

Item No.	Item	Quantity		Unit Costs			Total Cost
				Material	Labor/Equipment (L/E)	Total	
Lift Station							
A1	Miscellaneous Improvements	1	LS			$10,000.00	$10,000
A2	Miscellaneous Piping Adjustments (valves, connection to discharge, etc.)	1	LS			$20,000.00	$20,000
A3	Electrical Upgrades	1	LS			$119,000.00	$119,000
A4	120 hp	1	EA	$58,857.21	$14,714.30	$73,571.51	$73,572
A5	120 hp	1	EA	$58,857.21	$14,714.30	$73,571.51	$73,572
A6	Replace VFD	1	LS	$27,074.54	$5,414.91	$32,489.45	$32,489
A7							
				SubTotal:			**$328,632**

Assumptions: Well house and wet well structure are not significantly changed
Ability to isolate individual pump with existing isolation valves (significant bypass pumping not required)
Update instruments (flow monitoring and level sensor equipment)

Material & Labor Total:		**$328,632**
Contractors Overhead and Profit:	15%	$49,295
Mobilization:	10%	$32,863
Subtotal:		**$410,791**
Sales Tax:	8.6%	$35,328
Subtotal:		**$446,119**
Contingency:	30%	$133,836
Subtotal (Estimated Construction Cost):		**$579,954**
Engineering:	20%	$115,991
Legal and Administration:	10%	$57,995
Total Estimated Project Cost:		**$754,000**

MSA
Murray, Smith & Associates, Inc.
Engineers/Planners

Probable Project Cost
Pasco Comprehensive Sewer System Plan - CIP - Pearl Lift Station

Project: Pasco Comprehensive Sewer System Plan
Submittal: CIP - Pearl Lift Station
Owner: City of Pasco, Washington
Project No.: 11-1261
Date: December 21, 2012

Item No.	Item	Quantity		Unit Costs			Total Cost
				Material	Labor/Equipment (L/E)	Total	
Lift Station							
A1	New Pumps - Exist 10 hp and 10 hp, New capacity 250 gpm, and 5.5 hp	1	LS			$20,000.00	$20,000
A2	Force Main - 800 LF of 4"	1	LS			$64,429.00	$64,429
A3							
A4							
				SubTotal:			**$84,429**

Assumptions: Well house and wet well structure are not significantly changed
Ability to isolate individual pump with existing isolation valves (significant bypass pumping not required)
Update instruments (flow monitoring and level sensor equipment)

Material & Labor Total:		**$84,429**
Contractors Overhead and Profit:	15%	$12,664
Mobilization:	10%	$8,443
Subtotal:		**$105,536**
Sales Tax:	8.6%	$9,076
Subtotal:		**$114,612**
Contingency:	30%	$34,384
Subtotal (Estimated Construction Cost):		**$148,996**
Engineering:	20%	$29,799
Legal and Administration:	10%	$14,900
Total Estimated Project Cost:		**$194,000**

MSA
Murray, Smith & Associates, Inc.
Engineers/Planners

Probable Project Cost
Pasco Comprehensive Sewer System Plan - Road 44 Project - Phase 1 Confluence Improvements

Project: Pasco Comprehensive Sewer System Plan
Submittal: Road 44 Project - Phase 1 Confluence Improvements
Owner: City of Pasco, Washington
Project No.: 11-1261
Date: January 21, 2013

Item No.	Item	Quantity		Unit Costs			Total Cost
				Material	Labor/Equipment (L/E)	Total	
A1	Erosion Control	1	LS			$500.00	$500
A2	Bypass Pumping	1	LS			$10,000.00	$10,000
A3	US Manhole - 60 inch diameteter, depth 13 ft	1	LS			$11,355.00	$11,355
A4	DS Manhole - 60 inch diameteter, depth 20 ft	1	LS			$11,355.00	$11,355
A5	18" PVC Sewer Pipe - Average depth 14 ft	90	LF			$82.00	$7,380
A6	Pipe Abandonment	1	LS			$1,000.00	$1,000
A7	Surface Restoration	1,200	SF			$3.00	$3,600
A8							
					SubTotal:		**$45,190**
	Material & Labor Total:						**$45,190**
	Contractors Overhead and Profit:	15%					$6,779
	Mobilization:	10%					$4,519
	Subtotal:						**$56,488**
	Sales Tax:	8.6%					$4,858
	Subtotal:						**$61,345**
	Contingency:	30%					$18,404
	Subtotal (Estimated Construction Cost):						**$79,749**
	Engineering:	20%					$15,950
	Legal and Administration:	10%					$7,975
Total Estimated Project Cost:							**$104,000**

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Engineers/Planners

Probable Project Cost
Pasco Comprehensive Sewer System Plan - Road 44 Project - Phase 2 Odor Control

Project: Pasco Comprehensive Sewer System Plan
Submittal: Road 44 Project - Phase 2 Odor Control
Owner: City of Pasco, Washington
Project No.: 11-1261
Date: January 21, 2013

Item No.	Item	Quantity		Unit Costs			Total Cost
				Material	Labor/Equipment (L/E)	Total	
A1	Vapor Phase Odor Control	1	LS			$250,000.00	$250,000
A2	Surface Restoration	2,000	SF			$3.00	$6,000
A3							
					SubTotal:		**$256,000**
	Material & Labor Total:						**$256,000**
	Contractors Overhead and Profit:	15%					$38,400
	Mobilization:	10%					$25,600
	Subtotal:						**$320,000**
	Sales Tax:	8.6%					$27,520
	Subtotal:						**$347,520**
	Contingency:	30%					$104,256
	Subtotal (Estimated Construction Cost):						**$451,776**
	Engineering:	20%					$90,355
	Legal and Administration:	10%					$45,178
Total Estimated Project Cost:							**$588,000**

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Engineers/Planners

Probable Project Cost
Pasco Comprehensive Sewer System Plan - Road 44 Project - Phase 3 Odor Control

Project: Pasco Comprehensive Sewer System Plan
Submittal: Road 44 Project - Phase 3 Odor Control
Owner: City of Pasco, Washington
Project No.: 11-1261
Date: January 21, 2013

Item No.	Item	Quantity		Unit Costs			Total Cost
				Material	Labor/Equipment (L/E)	Total	
A1	Vapor Phase Odor Control	1	LS			$300,000.00	$300,000
A2	Surface Restoration	4,000	SF			$2.90	$11,600
A3							
				SubTotal:			**$311,600**

Material & Labor Total:		**$311,600**
Contractors Overhead and Profit:	15%	$46,740
Mobilization:	10%	$31,160
Subtotal:		**$389,500**
Sales Tax:	8.6%	$33,497
Subtotal:		**$422,997**
Contingency:	30%	$126,899
Subtotal (Estimated Construction Cost):		**$549,896**
Engineering:	20%	$109,979
Legal and Administration:	10%	$54,990
Total Estimated Project Cost:		**$715,000**

Murray, Smith & Associates, Inc.
Engineers/Planners

Probable Project Cost
Pasco Comprehensive Sewer System Plan - West Pasco Trunk Corrosion and Odor Control - Phase 1

Project: Pasco Comprehensive Sewer System Plan
Submittal: West Pasco Trunk Corrosion and Odor Control - Phase 1
Owner: City of Pasco, Washington
Project No.: 11-1261
Date: January 21, 2013

Item No.	Item	Quantity		Unit Costs			Total Cost
				Material	Labor/Equipment (L/E)	Total	
A1	Bioxide Equipment	1	LS			$125,000.00	$125,000
A2							
A3							
A4							
				SubTotal:			**$125,000**

Assumptions: RSMeans Packege Uility Lift Station
Land Acquisition is not included

Material & Labor Total:		**$125,000**
Contractors Overhead and Profit:	15%	$18,750
Mobilization:	10%	$12,500
Subtotal:		**$156,250**
Sales Tax:	8.6%	$13,438
Subtotal:		**$169,688**
Contingency:	30%	$50,906
Subtotal:		**$220,594**
Engineering:	20%	$44,119
Legal and Administration:	10%	$22,059
Total Estimated Project Cost:		**$287,000**

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Engineers/Planners

Probable Project Cost
Pasco Comprehensive Sewer System Plan - West Pasco Trunk Corrosion and Odor Control - Phase 2

Project: Pasco Comprehensive Sewer System Plan
Submittal: West Pasco Trunk Corrosion and Odor Control - Phase 2
Owner: City of Pasco, Washington
Project No.: 11-1261
Date: January 21, 2013

Item No.	Item	Quantity		Unit Costs			Total Cost
				Material	Labor/Equipment (L/E)	Total	
A1	Vapor Phase Odor Control	1	LS			$326,762.00	$326,762
A2	Surface Restoration	2,000	SF			$3.00	$6,000
A3							
A4							
				SubTotal:			**$332,762**

Assumptions: RSMeans Packege Uility Lift Station
Land Acquisition is not included

Material & Labor Total:		**$332,762**
Contractors Overhead and Profit:	15%	$49,914
Mobilization:	10%	$33,276
Subtotal:		**$415,953**
Sales Tax:	8.6%	$35,772
Subtotal:		**$451,724**
Contingency:	30%	$135,517
Subtotal:		**$587,242**
Engineering:	20%	$117,448
Legal and Administration:	10%	$58,724
Total Estimated Project Cost:		**$763,000**

Murray, Smith & Associates, Inc.
Engineers/Planners

Probable Project Cost
Pasco Comprehensive Sewer System Plan - West Pasco Trunk Repair Project

Project: Pasco Comprehensive Sewer System Plan
Submittal: West Pasco Trunk Repair Project
Owner: City of Pasco, Washington
Project No.: 11-1261
Date: January 21, 2013

Item No.	Item	Quantity		Unit Costs			Total Cost
				Material	Labor/Equipment (L/E)	Total	
A1	30-inch Structural CIPP	6,550	EA			$142.00	$930,100
A2	Bypass Pumping - Cost Per each Setup	22	EA			$3,590.00	$78,980
A3							
					SubTotal:		**$1,009,080**

Material & Labor Total:		**$1,009,080**
Contractors Overhead and Profit:	15%	$151,362
Mobilization:	10%	$100,908
Subtotal:		**$1,261,350**
Sales Tax:	8.6%	$108,476
Subtotal:		**$1,369,826**
Contingency:	30%	$410,948
Subtotal:		**$1,780,774**
Engineering:	20%	$356,155
Legal and Administration:	10%	$178,077
Total Estimated Project Cost:		**$2,315,000**

APPENDIX D

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Probable Project Cost
Pasco Comprehensive Sewer System Plan - WWTP - Anaerobic Digester #3

Project: Pasco Comprehensive Sewer System Plan
Submittal: WWTP - Anaerobic Digester #3
Owner: City of Pasco, Washington
Project No.: 11-1261
Date: January 28, 2014

Item No.	Item	Quantity		Unit Costs			Total Cost
				Material	Labor/Equipment (L/E)	Total	
A1	Ring Wall, Floor and Roof	1,205	CY			$650.00	$783,350
A2	Grout Floor	3,421	SF			$3.00	$10,264
A3	Excavation	5,626	CY			$10.00	$56,262
A4	Backfill	316	CY			$12.00	$3,793
A5	Mixer	1	LS			$250,000.00	$250,000
A6	Digester Control Building Expansion	2,000	SF			$150.00	$300,000
A7	Piping	1	LS			$422,000.00	$422,000
A8	Electrical, Instrumentation and Control	1	LS			$274,000.00	$274,000
A9	Undeveloped Mechanical	1	LS			$315,000.00	$315,000
				SubTotal:			**$2,414,669**

Material & Labor Total:		**$2,414,669**
Contractors Overhead and Profit:	15%	$362,200
Mobilization:	10%	$241,467
Subtotal:		**$3,018,336**
Sales Tax:	8.6%	$259,577
Subtotal:		**$3,277,913**
Contingency:	30%	$983,374
Subtotal (Estimated Construction Cost):		**$4,261,287**
Engineering:	20%	$852,257
Legal and Administration:	10%	$426,129
Total Estimated Project Cost:		**$5,540,000**

Murray, Smith & Associates, Inc.
Engineers/Planners

Probable Project Cost
Pasco Comprehensive Sewer System Plan - WWTP - Headworks Improvement

Project: Pasco Comprehensive Sewer System Plan
Submittal: WWTP - Headworks Improvement
Owner: City of Pasco, Washington
Project No.: 11-1261
Date: January 28, 2014

Item No.	Item	Quantity		Unit Costs: Material	Unit Costs: Labor/Equipment (L/E)	Unit Costs: Total	Total Cost
A1	Girt Chamber, Pump and Grit Classifier	1	EA			$240,000.00	$240,000
A2	Addition to the Headworks Building	660	SF			$200.00	$132,000
A3	Piping Modification	1	LS			$112,000.00	$112,000
A4	Channel Influent and Effluent Gates	6	EA			$10,000.00	$60,000
A5	Grit Classifier- Cyclone and Classifier SST w/ controls for existing grit chambers	2	EA			$60,000.00	$120,000
A6	Headworks Channels Grit Air Headers	3	EA			$10,750.00	$32,250
A7	Common Influent Channel Grit Removal - Remove Existing Grit	1	LS			$25,000.00	$25,000
A8	Common Influent Channel Grit Removal - Air Header	1	LS			$10,000.00	$10,000
A9	Electrical, Instrumentation and Control	1	LS			$110,000.00	$110,000
A10	Undeveloped Mechanical	1	LS			$37,000.00	$37,000
					SubTotal:		**$878,250**

Material & Labor Total:		**$878,250**
Contractors Overhead and Profit:	15%	$131,738
Mobilization:	10%	$87,825
Subtotal:		**$1,097,813**
Sales Tax:	8.6%	$94,412
Subtotal:		**$1,192,224**
Contingency:	30%	$357,667
Subtotal (Estimated Construction Cost):		**$1,549,892**
Engineering:	20%	$309,978
Legal and Administration:	10%	$154,989
Total Estimated Project Cost:		**$2,015,000**

Murray, Smith & Associates, Inc.
Engineers/Planners

Probable Project Cost
Pasco Comprehensive Sewer System Plan - WWTP - Secondary Treatment - Nitrification

Project: Pasco Comprehensive Sewer System Plan
Submittal: WWTP - Secondary Treatment - Nitrification
Owner: City of Pasco, Washington
Project No.: 11-1261
Date: January 28, 2014

Item No.	Item	Quantity		Unit Costs			Total Cost
				Material	Labor/Equipment (L/E)	Total	
Aeration Basin							
A1	Exterior Wall	272	CY			$550.00	$149,508
A2	Exterior Wall	68	CY			$550.00	$37,538
A3	Exterior Wall	68	CY			$550.00	$37,538
A4	Interior Wall	272	CY			$550.00	$149,508
A5	Slab	565	CY			$550.00	$310,977
A6	Baffle Wall	68	CY			$550.00	$37,538
A7	Exterior Wall	68	CY			$550.00	$37,538
A8	Exterior Wall	68	CY			$550.00	$37,538
A9	Interior Wall	272	CY			$550.00	$149,508
A10	Slab	565	CY			$550.00	$310,977
A11	Baffle Wall	68	CY			$550.00	$37,538
A12	Exterior Wall	272	CY			$550.00	$149,508
A13	Exterior Wall	68	CY			$550.00	$37,538
A14	Exterior Wall	68	CY			$550.00	$37,538
A15	Slab	565	CY			$550.00	$310,977
A16	Baffle Wall	68	CY			$550.00	$37,538
A17	Aeration Diffuser System	8,250	EA			$45.00	$371,250
A18	Railing	654	LF			$75.00	$49,020
A19	Skimmer Mechanics and Piping	4	EA			$25,000.00	$100,000
A20	Dewatering Pumps	4	EA			$15,000.00	$60,000
A21	Sensors and Probes	1	LS			$100,000.00	$100,000
A22	Piping	1	LS			$490,000.00	$490,000
A23	Electrical, Instrumentation and Control	1	LS			$383,000.00	$383,000
A24	Undeveloped Mechanical	1	LS			$152,000.00	$152,000
				SubTotal:			**$3,574,073**
Blower Building							
B1	Building	2,300	SF			$200.00	$460,000
B2	Blowers	4	EA			$120,000.00	$480,000
B3	Blower Install	4	EA			$20,000.00	$80,000
B4	Blower Plenum	1	EA			$80,000.00	$80,000
B5	Blower Intake Piping	50	LF			$216.00	$10,800
B6	Blower Discharge Piping	50	LF			$216.00	$10,800
B7	Aeration Piping to Basins	500	LF			$160.00	$80,000
B8	Crane	1	EA			$30,000.00	$30,000
B9	Electrical, Instrumentation and Control	1	LS			$185,000.00	$185,000
B10	Undeveloped Mechanical	1	LS			$62,000.00	$62,000
				SubTotal:			**$1,478,600**

Material & Labor Total:		**$5,052,673**
Contractors Overhead and Profit:	15%	$757,901
Mobilization:	10%	$505,267
Subtotal:		**$6,315,841**
Sales Tax:	8.6%	$543,162
Subtotal:		**$6,859,003**
Contingency:	30%	$2,057,701
Subtotal (Estimated Construction Cost):		**$8,916,704**
Engineering:	20%	$1,783,341

	Legal and Administration:	10%	$891,670
Total Estimated Project Cost:			**$11,592,000**

Murray, Smith & Associates, Inc.
Engineers/Planners

Probable Project Cost
Pasco Comprehensive Sewer System Plan - Outfall Segment 1

Project: Pasco Comprehensive Sewer System Plan
Submittal: Outfall Segment 1
Owner: City of Pasco, Washington
Project No.: 11-1261
Date: January 28, 2014

Item No.	Item	Quantity		Unit Costs			Total Cost
				Material	Labor/Equipment (L/E)	Total	
Outfall Pipeline							
A1	Segment 1 - 900 LF of 24"	1	LS			$212,000.00	$212,000
A2							
				SubTotal:			**$212,000**
	Material & Labor Total:						**$212,000**
	Contractors Overhead and Profit:	15%					$31,800
	Mobilization:	10%					$21,200
	Subtotal:						**$265,000**
	Sales Tax:	8.6%					$22,790
	Subtotal:						**$287,790**
	Contingency:	30%					$86,337
	Subtotal:						**$374,127**
	Predesign Engineer Study:	20%					$74,825
	Engineering Design:	20%					$74,825
	Legal and Administration:	10%					$37,413
Total Estimated Project Cost:							**$561,000**

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Murray, Smith & Associates, Inc.
Engineers/Planners

Probable Project Cost
Pasco Comprehensive Sewer System Plan - Outfall Segment 2

Project: Pasco Comprehensive Sewer System Plan
Submittal: Outfall Segment 2
Owner: City of Pasco, Washington
Project No.: 11-1261
Date: January 28, 2014

Item No.	Item	Quantity		Unit Costs			Total Cost
				Material	Labor/Equipment (L/E)	Total	
Outfall Pipeline							
A1	Segement 2 - 517 LF of 36" To River	1	LS			$170,000.00	$170,000
A2	Segement 2 - 800 LF of 36" In River with Diffuser	1	LS			$664,000.00	$664,000
A3							
					SubTotal:		**$834,000**

Material & Labor Total:		**$834,000**
Contractors Overhead and Profit:	15%	$125,100
Mobilization:	10%	$83,400
Subtotal:		**$1,042,500**
Sales Tax:	8.6%	$89,655
Subtotal:		**$1,132,155**
Contingency:	30%	$339,647
Subtotal:		**$1,471,802**
Engineering:	20%	$294,360
Legal and Administration:	10%	$147,180
Total Estimated Project Cost:		**$1,913,000**

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Murray, Smith & Associates, Inc.
Engineers/Planners

Probable Project Cost
Pasco Comprehensive Sewer System Plan - WWTP - Phosphorus Treatment Expansion

Project: Pasco Comprehensive Sewer System Plan
Submittal: WWTP - Phosphorus Treatment Expansion
Owner: City of Pasco, Washington
Project No.: 11-1261
Date: January 28, 2014

Item No.	Item	Quantity		Unit Costs			Total Cost
				Material	Labor/Equipment (L/E)	Total	
Anaerobic/Anoxic							
A1	Exterior Wall	219	CY			$550.00	$120,313
A2	Exterior Wall	219	CY			$550.00	$120,313
A3	Exterior Wall	53	CY			$550.00	$28,875
A4	Interior Wall	53	CY			$550.00	$28,875
A5	Slab	500	CY			$550.00	$275,000
A6	Excavation	4,951	CY			$10.00	$49,511
A7	Backfill	1,238	CY			$12.00	$14,853
A8	Piping	1	LS			$155,600.00	$155,600
A9	Sensors and Probes	1	LS			$50,000.00	$50,000
A10	Mixers	4	EA			$20,000.00	$80,000
A11	Mixer Supports/Install	4	EA			$15,000.00	$60,000
A12	Electrical, Instrumentation and Control	1	LS			$148,000.00	$148,000
A13	Undeveloped Mechanical	1	LS			$50,000.00	$50,000
				SubTotal:			**$1,181,339**
Aeration							
B1	Exterior Wall	671	CY			$550.00	$368,958
B2	Exterior Wall	272	CY			$550.00	$149,508
B3	Exterior Wall	67	CY			$550.00	$36,896
B4	Interior Baffle Wall	67	CY			$550.00	$36,896
B5	Interior Baffle Wall	67	CY			$550.00	$36,896
B6	Slab	565	CY			$550.00	$310,977
B7	Aeration Diffuser System	2,750	EA			$45.00	$123,750
B8	Railing	400	LF			$75.00	$30,000
B9	Skimmer Mechanics and Piping	4	EA			$5,000.00	$20,000
B10	Dewatering Pumps	4	EA			$5,000.00	$20,000
B11	Piping	1	LS			$168,000.00	$168,000
B12	Electrical, Instrumentation and Control	1	LS			$142,000.00	$142,000
B13	Undeveloped Mechanical	1	LS			$57,000.00	$57,000
				SubTotal:			**$1,500,882**
Tricking Filter Demo							
C1	Concrete Demolition, Slab	11,310	SF			$1.00	$11,310
C2	Concrete Demolition, Wall	4,524	SF			$2.00	$9,048
C3	Rock Removal	3,351	CY			$1.75	$5,864
C4	Removal and Haul	3,672	CY			$20.00	$73,443
C5	Backfill - Borrow from other excavation	3,672	CY			$1.00	$3,672
				SubTotal:			**$103,337**
Intermediate Clarifier Demo							
D1	Concrete Demolition, Slab	5,675	SF			$1.00	$5,675
D2	Concrete Demolition, Wall	3,036	SF			$2.00	$6,072
D3	Removal and Haul	180	CY			$20.00	$3,601
D4	Backfill - Borrow from other excavation	180	CY			$1.00	$180
				SubTotal:			**$15,528**
Pump Station Demo							
E1	Intermediate Clarifier Sludge Pump Station Demo	1	LS			$25,000.00	$25,000
E2	Trickling Filter Recirculation Pump Station Demo	1	LS			$25,000.00	$25,000
				SubTotal:			**$50,000**
	Material & Labor Total:						**$2,851,086**
	Contractors Overhead and Profit:	15%					$427,663
	Mobilization:	10%					$285,109

Subtotal:		**$3,563,858**
Sales Tax:	8.6%	$306,492
Subtotal:		**$3,870,350**
Contingency:	30%	$1,161,105
Subtotal (Estimated Construction Cost):		**$5,031,455**
Engineering:	20%	$1,006,291
Legal and Administration:	10%	$503,145
Total Estimated Project Cost:		**$6,541,000**

Murray, Smith & Associates, Inc.
Engineers/Planners

Probable Project Cost
Pasco Comprehensive Sewer System Plan - WWTP - Primary Treatment Expansion

Project: Pasco Comprehensive Sewer System Plan
Submittal: WWTP - Primary Treatment Expansion
Owner: City of Pasco, Washington
Project No.: 11-1261
Date: January 28, 2014

Item No.	Item	Quantity		Unit Costs			Total Cost
				Material	Labor/Equipment (L/E)	Total	
Primary Clarifier Influent Splitter							
A1	Excavation	50	CY			$10.00	$500
A2	Backfill	25	CY			$10.00	$250
A3	Slab, concrete	15	CY			$550.00	$8,250
A4	Wall, concrete	10	CY			$550.00	$5,500
A5	Misc. grouting	11	CY			$550.00	$6,050
A6	Grating	837	SF			$11.00	$9,207
A7	Railing	120	LF			$75.00	$9,000
A8	Steps	2	EA			$6,000.00	$12,000
A9	Downward opening slide gates	4	EA			$4,500.00	$18,000
A10	Sluice gates	2	EA			$6,500.00	$13,000
A11	36" DI thimbles	4	EA			$1,500.00	$6,000
A12	Piping Modification	1	LS			$27,000.00	$27,000
A13	Electrical, Instrumentation and Control	1	LS			$14,000.00	$14,000
A14	Undeveloped Mechanical	1	LS			$6,000.00	$6,000
				SubTotal:			**$134,757**
Primary Clarifier							
B1	Excavation	1,583	CY			$10.00	$15,833
B2	Backfill	792	CY			$10.00	$7,917
B3	Exterior Wall - 1	65	CY			$550.00	$35,648
B4	Exterior Wall - 2	65	CY			$550.00	$35,648
B5	Exterior Wall - 3	8	CY			$550.00	$4,397
B6	Exterior Wall - 4	8	CY			$550.00	$4,397
B7	Interior Wall	117	CY			$550.00	$64,167
B8	Slab - 1	69	CY			$550.00	$37,685
B9	Slab - 2	69	CY			$550.00	$37,685
B10	Flight	1	LS			$196,488.36	$196,488
B11	Weir	1	LS			$13,000.00	$13,000
B12	Piping	1	LS			$66,000.00	$66,000
B13	Electrical, Instrumentation and Control	1	LS			$78,000.00	$78,000
B14	Undeveloped Mechanical	1	LS			$26,000.00	$26,000
				SubTotal:			**$622,865**
Primary Sludge Pump Station							
C1	Excavation	450	CY			$10.00	$4,500
C2	Backfill	50	CY			$10.00	$500
C3	Slab, concrete	100	CY			$550.00	$55,000
C4	Wall, concrete	93	CY			$550.00	$51,333
C5	misc grouting	9	CY			$550.00	$5,133
C6	Railing	120	LF			$75.00	$9,000
C7	Steps	2	EA			$6,000.00	$12,000
C8	Building	784	SF			$200.00	$156,800
C9	Lobepro Pump	4	EA			$32,500.00	$130,000
C10	Mechanical Piping	1	LS			$127,280.00	$127,280
C11	Site Piping	1	LS			$127,280.00	$127,280
C12	Electrical, Instrumentation and Control	1	LS			$64,000.00	$64,000
C13	Undeveloped Mechanical	1	LS			$28,000.00	$28,000
				SubTotal:			**$770,827**
Primary Effluent Splitter							
D1	Excavation	50	CY			$10.00	$500
D2	Backfill	25	CY			$10.00	$250
D3	Slab, concrete	15	CY			$550.00	$8,250
D4	Wall, concrete	10	CY			$550.00	$5,500
D5	Misc. grouting	11	CY			$550.00	$6,050

D6	Grating	837	SF			$11.00	$9,207
D7	Railing	120	LF			$75.00	$9,000
D8	Steps	2	EA			$6,000.00	$12,000
D9	Downward opening slide gates	4	EA			$4,500.00	$18,000
D10	Sluice gates	2	EA			$6,500.00	$13,000
D11	36" DI thimbles	4	EA			$1,500.00	$6,000
D12	36 Mag Meter and Vault	1	EA			$27,000.00	$27,000
D13	Piping Modification	1	LS			$27,000.00	$27,000
D14	Electrical, Instrumentation and Control	1	LS			$18,000.00	$18,000
D15	Undeveloped Mechanical	1	LS			$6,000.00	$6,000
				SubTotal:			**$165,757**

Material & Labor Total:		**$1,694,206**
Contractors Overhead and Profit:	15%	$254,131
Mobilization:	10%	$169,421
Subtotal:		**$2,117,757**
Sales Tax:	8.6%	$182,127
Subtotal:		**$2,299,884**
Contingency:	30%	$689,965
Subtotal (Estimated Construction Cost):		**$2,989,849**
Engineering:	20%	$597,970
Legal and Administration:	10%	$298,985
Total Estimated Project Cost:		**$3,887,000**

Murray, Smith & Associates, Inc.
Engineers/Planners

Probable Project Cost
Pasco Comprehensive Sewer System Plan - WWTP - Process Building Expansion

Project: Pasco Comprehensive Sewer System Plan
Submittal: WWTP - Process Building Expansion
Owner: City of Pasco, Washington
Project No.: 11-1261
Date: January 28, 2014

Item No.	Item	Quantity		Unit Costs			Total Cost
				Material	Labor/Equipment (L/E)	Total	
A1	New Office	1,200	SF			$200.00	$240,000
A2	Demo Existing Bathrooms	914	LS			$1.24	$1,133
A3	Demo Existing Electrical	5,000	LS			$1.24	$6,200
A4	Demo Existing Pumps	2,500	EA			$2.00	$5,000
A5	Demo Existing Piping - Pump Station	15	LF			$46.00	$669
A6	Remodel Primary Pump Station Area - New Office/Locker Room	738	SF			$140.65	$103,823
				SubTotal:			**$356,826**
	Material & Labor Total:						**$356,826**
	Contractors Overhead and Profit:	15%					$53,524
	Mobilization:	10%					$35,683
	Subtotal:						**$446,032**
	Sales Tax:	8.6%					$38,359
	Subtotal:						**$484,391**
	Contingency:	30%					$145,317
	Subtotal (Estimated Construction Cost):						**$629,708**
	Engineering:	20%					$125,942
	Legal and Administration:	10%					$62,971
Total Estimated Project Cost:							**$819,000**

MSA
Murray, Smith & Associates, Inc.
Engineers/Planners

Probable Project Cost
Pasco Comprehensive Sewer System Plan - WWTP - Secondary Clarification Expansion #3

Project: Pasco Comprehensive Sewer System Plan
Submittal: WWTP - Secondary Clarification Expansion #3
Owner: City of Pasco, Washington
Project No.: 11-1261
Date: January 28, 2014

Item No.	Item	Quantity		Unit Costs			Total Cost
				Material	Labor/Equipment (L/E)	Total	
A1	Ring Wall and Floor	740	CY			$600.00	$443,728
A2	Grout Floor	7,088	SF			$3.35	$23,746
A3	Excavation	5,926	CY			$10.00	$59,256
A4	Backfill	333	CY			$12.00	$3,995
A5	FRP Weirs and Baffles	1	LS			$30,000.00	$30,000
A6	Mechanism	95	DIA FT			$2,000.00	$190,000
A7	Gates	2	EA			$12,500.00	$25,000
A8	Finish floor of Existing SC(7088 sq ft at 2"	44	CY			$500.00	$21,877
A9	Sandblast and Paint Existing Mechanisms	2	EA			$25,000.00	$50,000
A10	Piping	1	LS			$226,000.00	$226,000
A11	Access to RAS/WAS Pump Station	1	LS			$25,000.00	$25,000
A12	Electrical, Instrumentation and Control	1	LS			$162,000.00	$162,000
A13	Undeveloped Mechanical	1	LS			$54,000.00	$54,000
					SubTotal:		**$1,314,600**

Material & Labor Total:		**$1,314,600**
Contractors Overhead and Profit:	15%	$197,190
Mobilization:	10%	$131,460
Subtotal:		**$1,643,251**
Sales Tax:	8.6%	$141,320
Subtotal:		**$1,784,570**
Contingency:	30%	$535,371
Subtotal (Estimated Construction Cost):		**$2,319,941**
Engineering:	20%	$463,988
Legal and Administration:	10%	$231,994
Total Estimated Project Cost:		**$3,016,000**

MSA
Murray, Smith & Associates, Inc.
Engineers/Planners

Probable Project Cost
Pasco Comprehensive Sewer System Plan - WWTP - Secondary Clarification Expansion #4

Project: Pasco Comprehensive Sewer System Plan
Submittal: WWTP - Secondary Clarification Expansion #4
Owner: City of Pasco, Washington
Project No.: 11-1261
Date: January 28, 2014

Item No.	Item	Quantity		Unit Costs			Total Cost
				Material	Labor/Equipment (L/E)	Total	
A1	Ring Wall and Floor	740	CY			$600.00	$443,728
A2	Grout Floor	7,088	SF			$3.35	$23,746
A3	Excavation	5,926	CY			$10.00	$59,256
A4	Backfill	333	CY			$12.00	$3,995
A5	FRP Weirs and Baffles	1	LS			$30,000.00	$30,000
A6	Mechanism	95	DIA FT			$2,000.00	$190,000
A7	Piping	1	LS			$226,000.00	$226,000
A8	Electrical, Instrumentation and Control	1	LS			$147,000.00	$147,000
A9	Undeveloped Mechanical	1	LS			$49,000.00	$49,000
				SubTotal:			**$1,172,724**
	Material & Labor Total:						**$1,172,724**
	Contractors Overhead and Profit:	15%					$175,909
	Mobilization:	10%					$117,272
	Subtotal:						**$1,465,905**
	Sales Tax:	8.6%					$126,068
	Subtotal:						**$1,591,973**
	Contingency:	30%					$477,592
	Subtotal (Estimated Construction Cost):						**$2,069,565**
	Engineering:	20%					$413,913
	Legal and Administration:	10%					$206,956
Total Estimated Project Cost:							**$2,690,000**

Murray, Smith & Associates, Inc.
Engineers/Planners

Probable Project Cost

Pasco Comprehensive Sewer System Plan - WWTP - Waste Activated Sludge Thickening

Project: Pasco Comprehensive Sewer System Plan
Submittal: WWTP - Waste Activated Sludge Thickening
Owner: City of Pasco, Washington
Project No.: 11-1261
Date: January 28, 2014

Item No.	Item	Quantity		Unit Costs			Total Cost
				Material	Labor/Equipment (L/E)	Total	
Dissolved Air Floatation Thickener							
A1	Ring Wall and Floor	107	CY			$650.00	$69,754
A2	Grout Floor	314	SF			$3.56	$1,118
A3	Excavation	296	CY			$10.00	$2,958
A4	Mechanism	1	EA			$170,000.00	$170,000
A5	Piping	1	LS			$74,000.00	$74,000
A6	Electrical, Instrumentation and Control	1	LS			$48,000.00	$48,000
A7	Undeveloped Mechanical	1	LS			$19,000.00	$19,000
				SubTotal:			**$384,830**
	Material & Labor Total:						**$384,830**
	Contractors Overhead and Profit:	15%					$57,725
	Mobilization:	10%					$38,483
	Subtotal:						**$481,038**
	Sales Tax:	8.6%					$41,369
	Subtotal:						**$522,407**
	Contingency:	30%					$156,722
	Subtotal (Estimated Construction Cost):						**$679,130**
	Engineering:	20%					$135,826
	Legal and Administration:	10%					$67,913
Total Estimated Project Cost:							**$883,000**

APPENDIX E

Presentation for

Comprehensive Sewer Plan

CITY OF PASCO

September 12, 2011

Tom Perry, P.E.
Joe Foote, P.E.

MSA
Murray, Smith & Associates, Inc.

Pasco-Specific Issues Shape the Comprehensive Sewer Plan

Project Understanding

General Mission:

To develop a plan that will define an effective, sustainable and economical approach to manage the current and future wastewater needs for the City of Pasco.

The Need:

Last Comprehensive Sewer Plan -1992, amended in 1999.

Project Approach

Project Definition

- Understanding
- Criteria
- System Condition

System Analysis

- Modeling/ Evaluations
- Defined Needs
- Alternatives

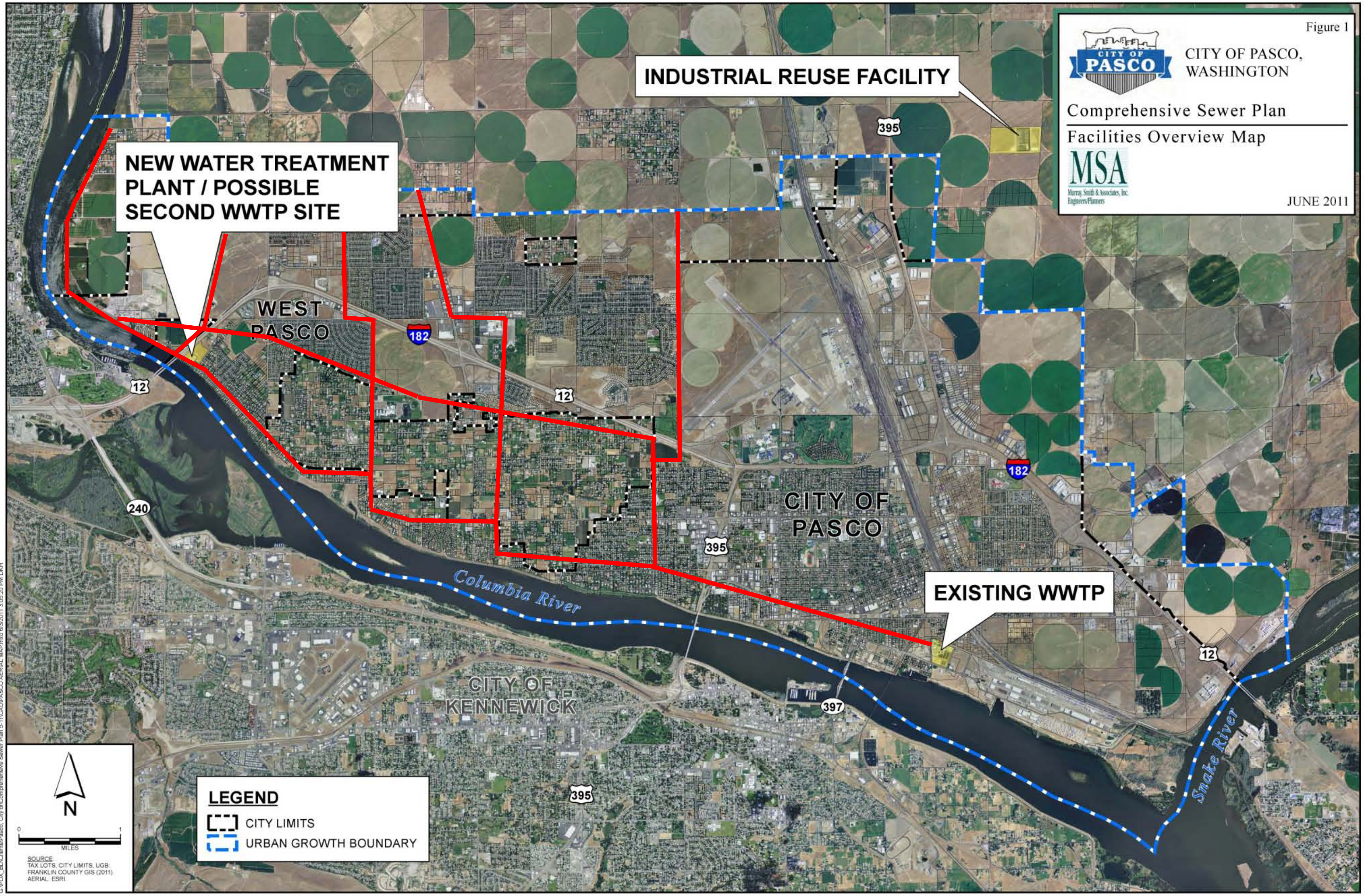
CIP Development Road Map

- Alternatives Analysis
- CIP Development
- Implementation

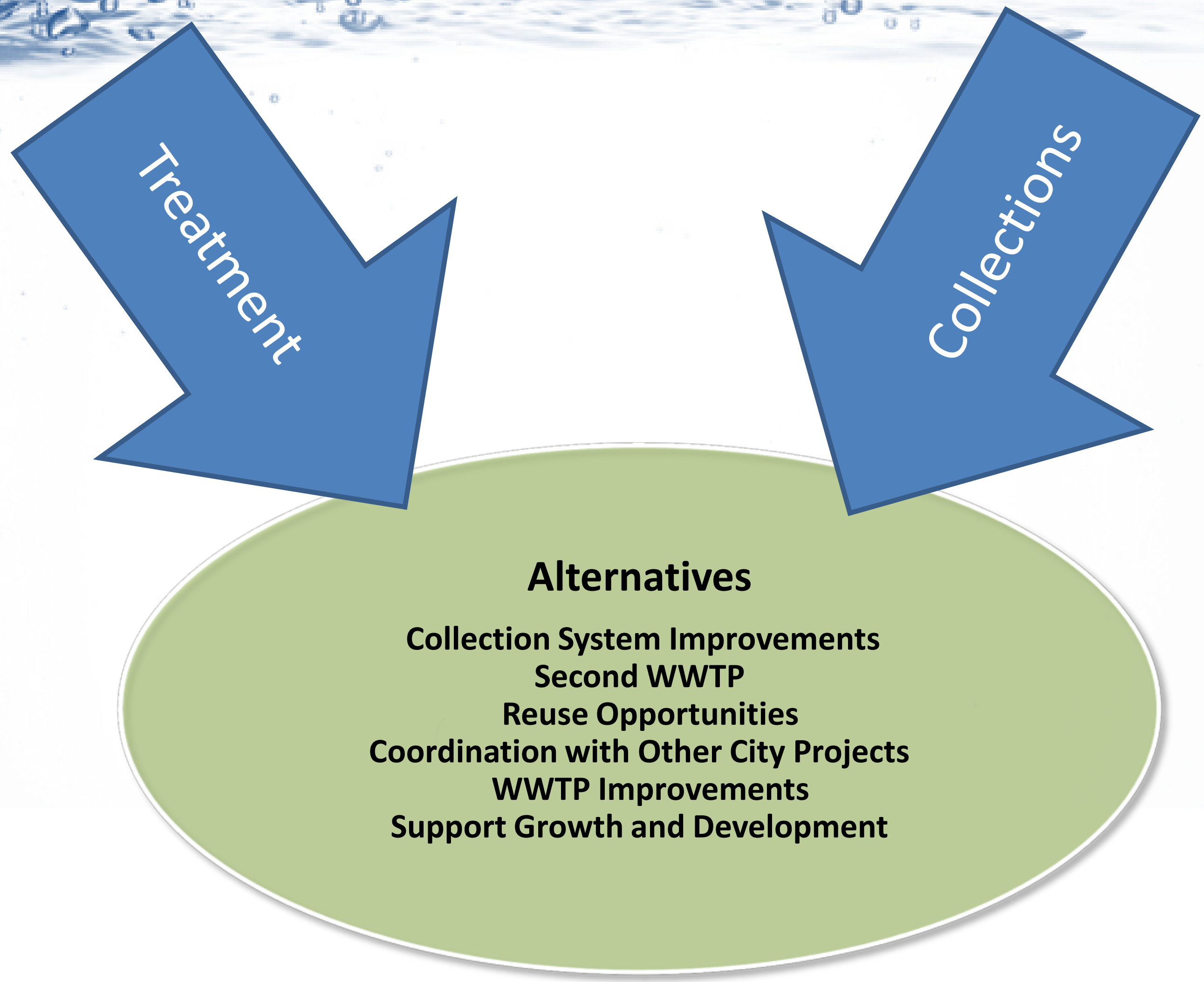
Project Definition - Goals

- Evaluate Existing System
- Define Future Conditions
- Develop Necessary Tools
- Alternatives - Second WWTP
- Capital Improvement Plan
- Documentation
- Agency Compliant - WAC 173-240-050, 173-240-060 and Receives DOE Approval by October 2012

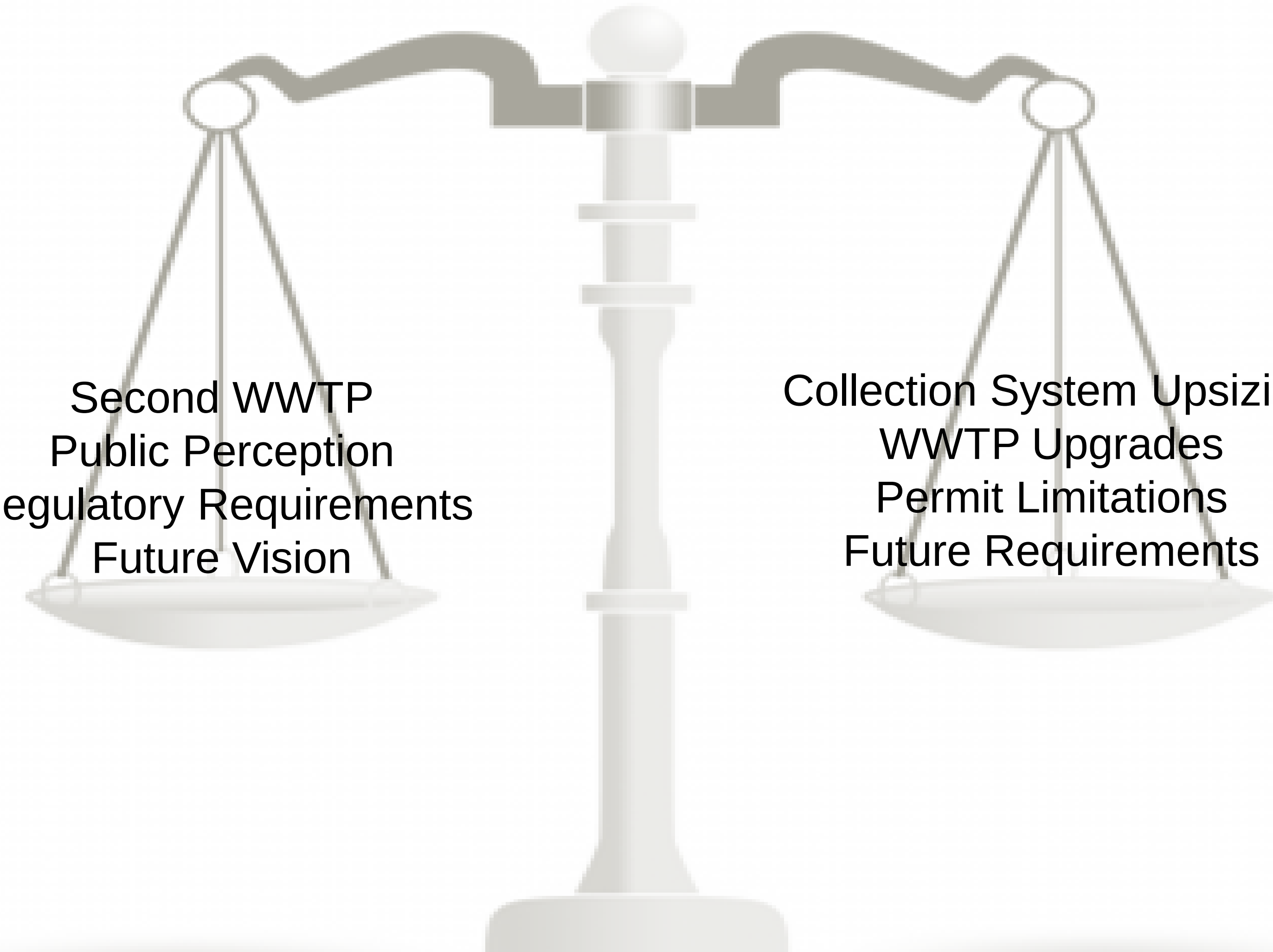
System Analysis



Alternatives Development



Alternatives Analysis



Second WWTP
Public Perception
Regulatory Requirements
Future Vision

Collection System Upsizing
WWTP Upgrades
Permit Limitations
Future Requirements

Weighing the Options…

Comprehensive Sewer Plan

- Defines Future Vision
- Capital Improvements Plan (CIP)
  - Identifies Projects
  - Costs
  - Implementation Strategy
- Usable Documents & Tools
  - Defendable Document
  - Supports Future Growth and Development
  - Modeling, GIS Based
- Agency Compliant

Presentation for

Comprehensive Sewer Plan

CITY OF PASCO

April 18, 2012

MSA

Murray, Smith & Associates, Inc.

Pasco-Specific Issues Shape the Comprehensive Sewer Plan

Project Understanding

General Mission:

To develop a plan that will define an effective, sustainable and economical approach to manage the current and future wastewater needs for the City of Pasco.

The Need:

Last Comprehensive Sewer Plan -1992, amended in 1999.

Project Approach/Goals

Data Collection
- Understanding
- System Condition
- Future Conditions

System Analysis
- Collection & Treatment
- Defined Needs
- Alternatives Analysis

Comprehensive Sewer Plan - Road Map
- Preferred Alternatives
- CIP Development
- Approvals

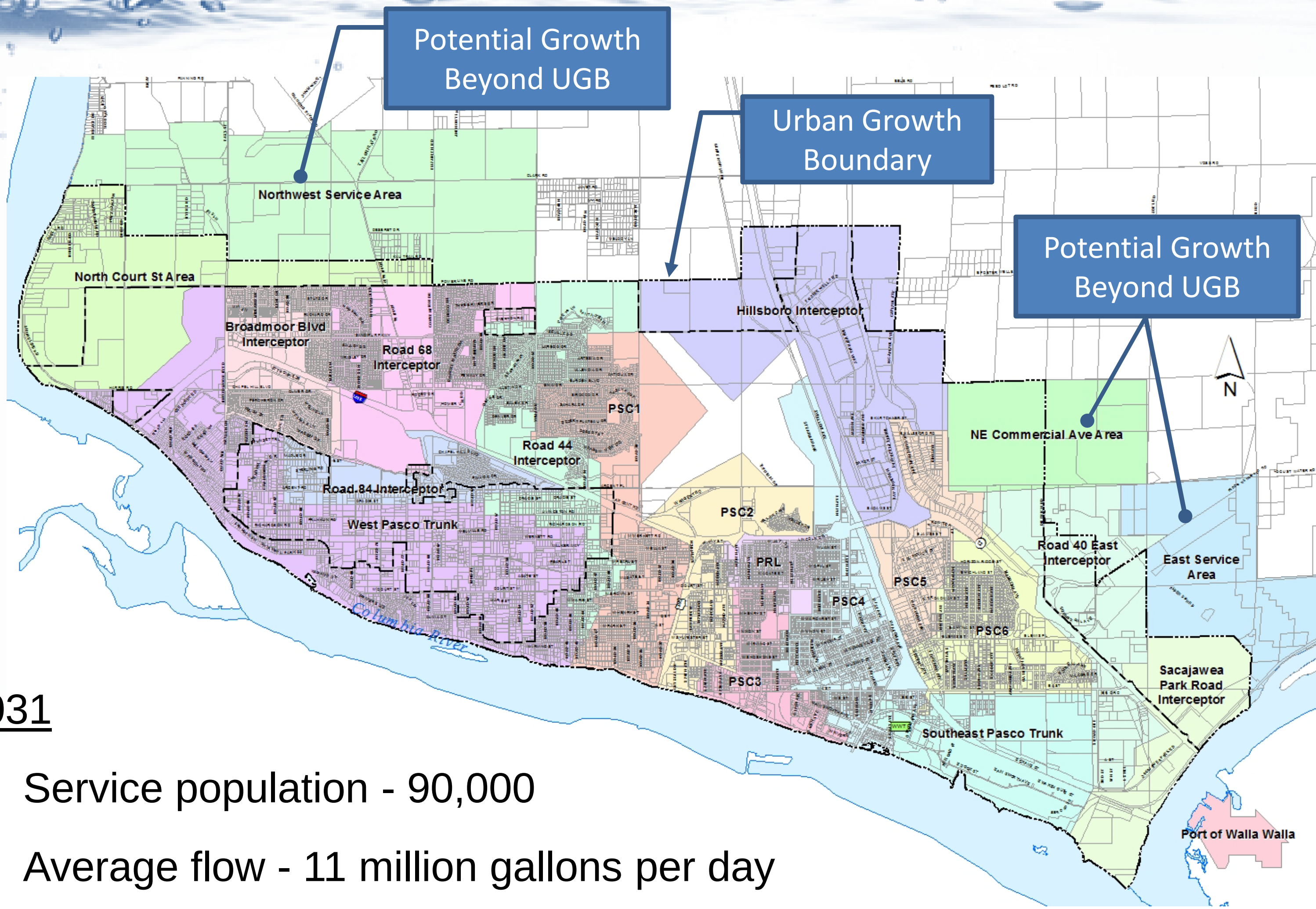
Progress to Date

- Data Collection
  - Work with Staff
- Define future conditions
  - Service areas & flows
  - Regulatory requirements/permit conditions
- System Analysis
  - Existing collection & treatment
  - Define future needs
- Advisory Committee Engaged

Future Conditions

- 20 Year Planning Window
  - Based on:
    - City's Comprehensive Plan
    - City's Water System Plan
    - Regional Transportation Plan
    - Existing and future service areas & flows
    - Local, regional, and state growth projections

Future Conditions



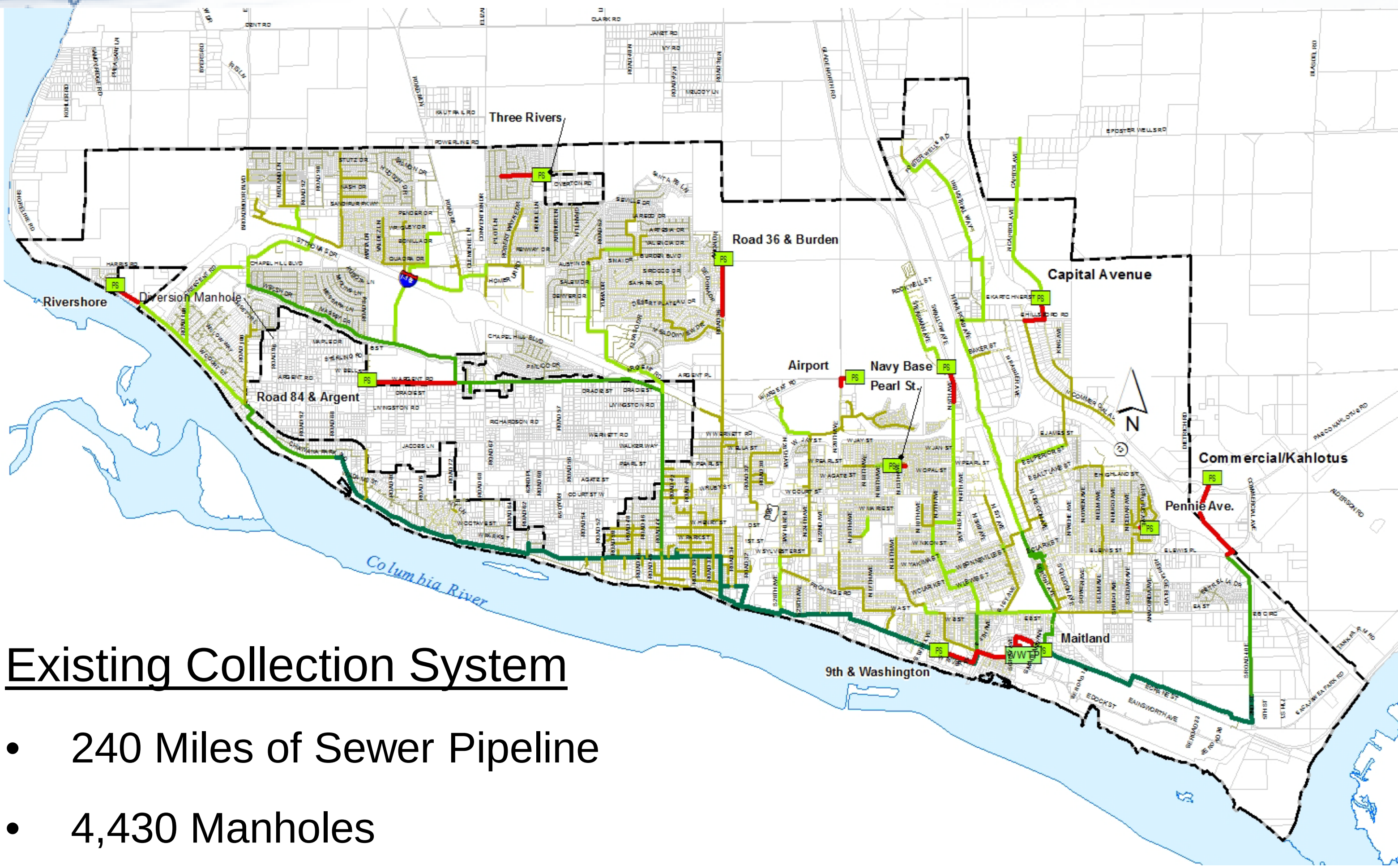
2031

- Service population - 90,000
- Average flow - 11 million gallons per day

Collection System Analysis

- Computer Model Development
- Model Calibration
  - Compare model with actual system flows
- Evaluate for:
  - Current conditions
  - Future conditions

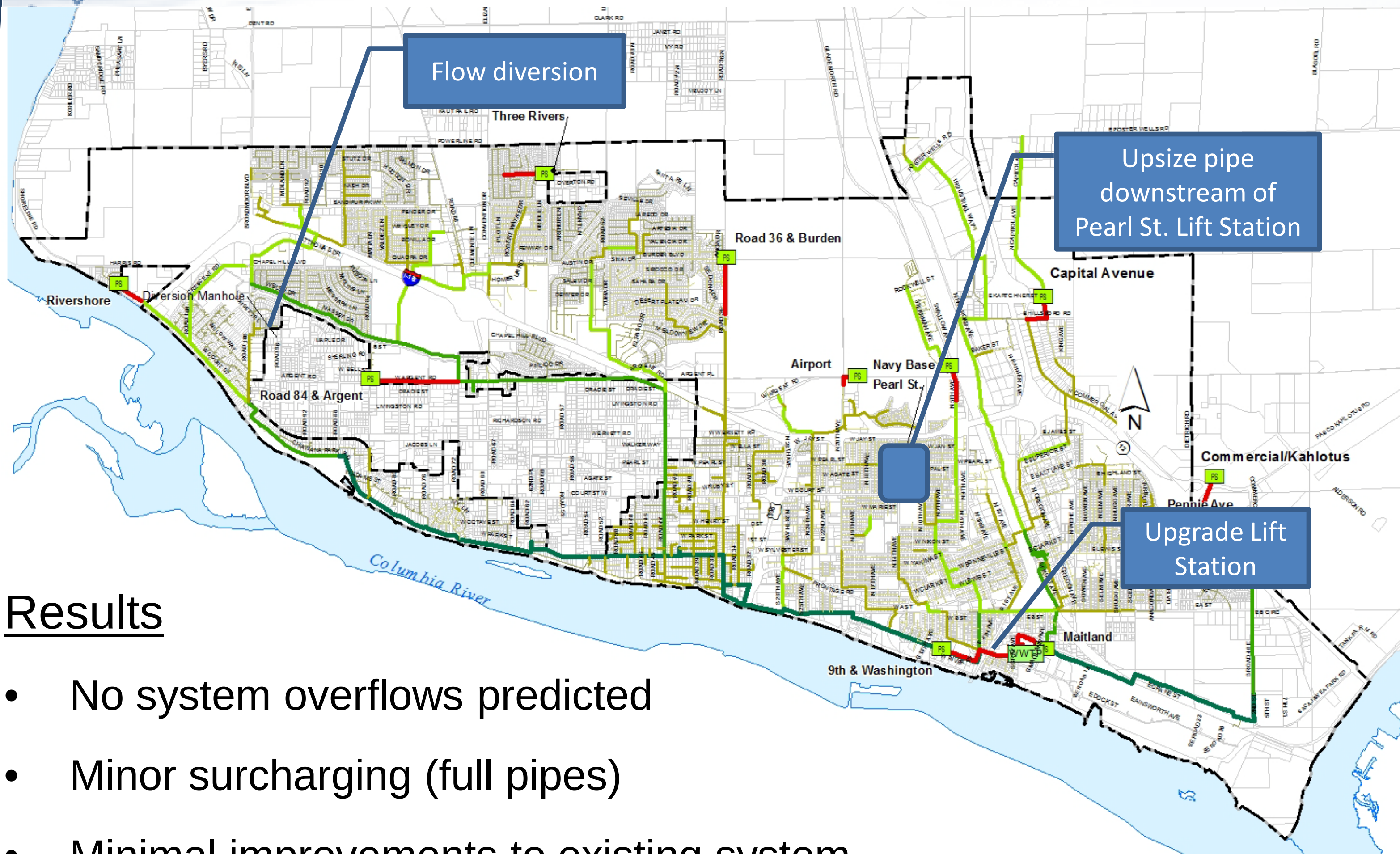
Collection System Analysis



Existing Collection System

- 240 Miles of Sewer Pipeline
- 4,430 Manholes
- 12 Lift Stations

Collection Analysis Results



Results

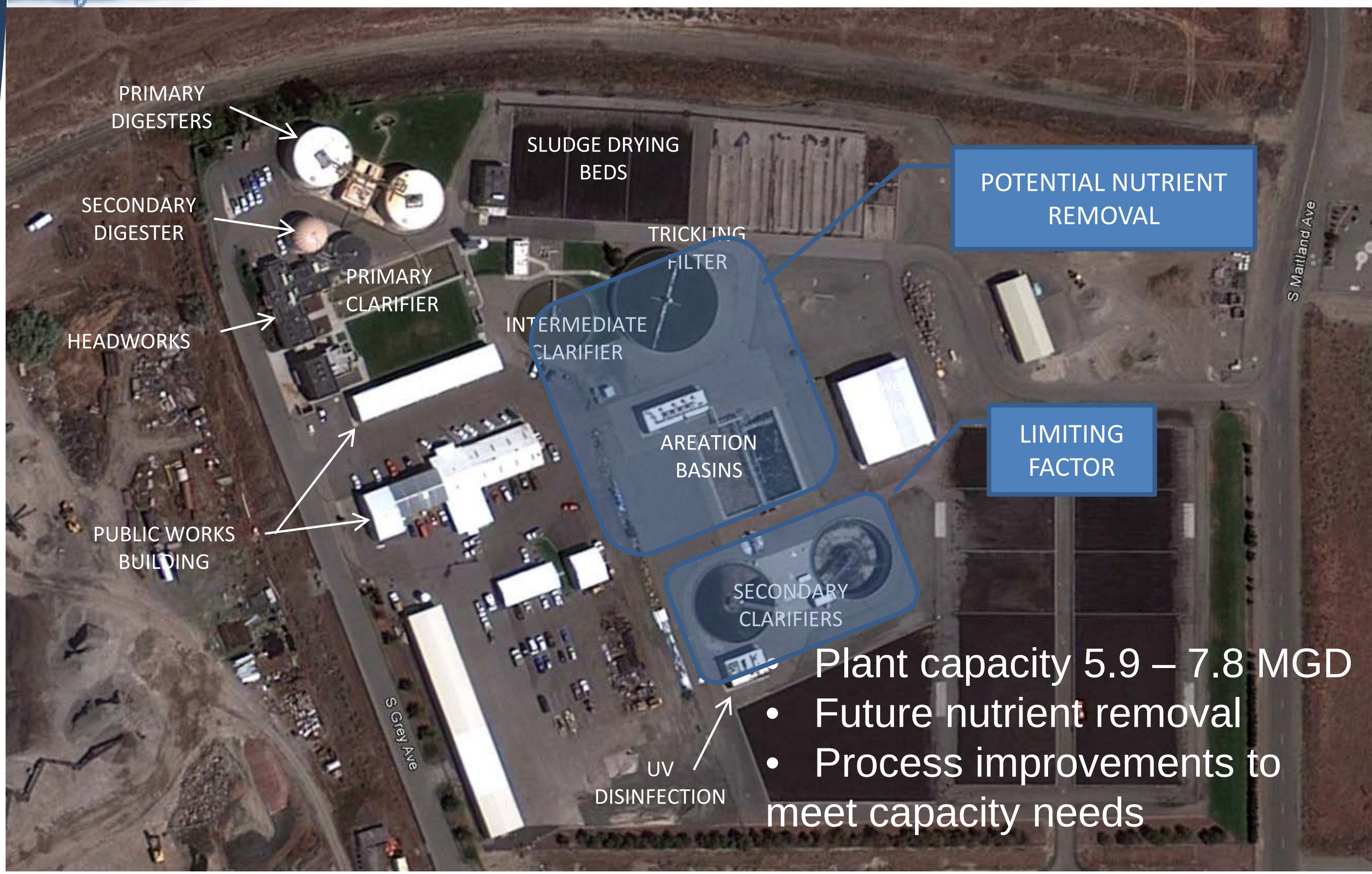
- No system overflows predicted
- Minor surcharging (full pipes)
- Minimal improvements to existing system

Treatment System Analysis

Treatment System Analysis

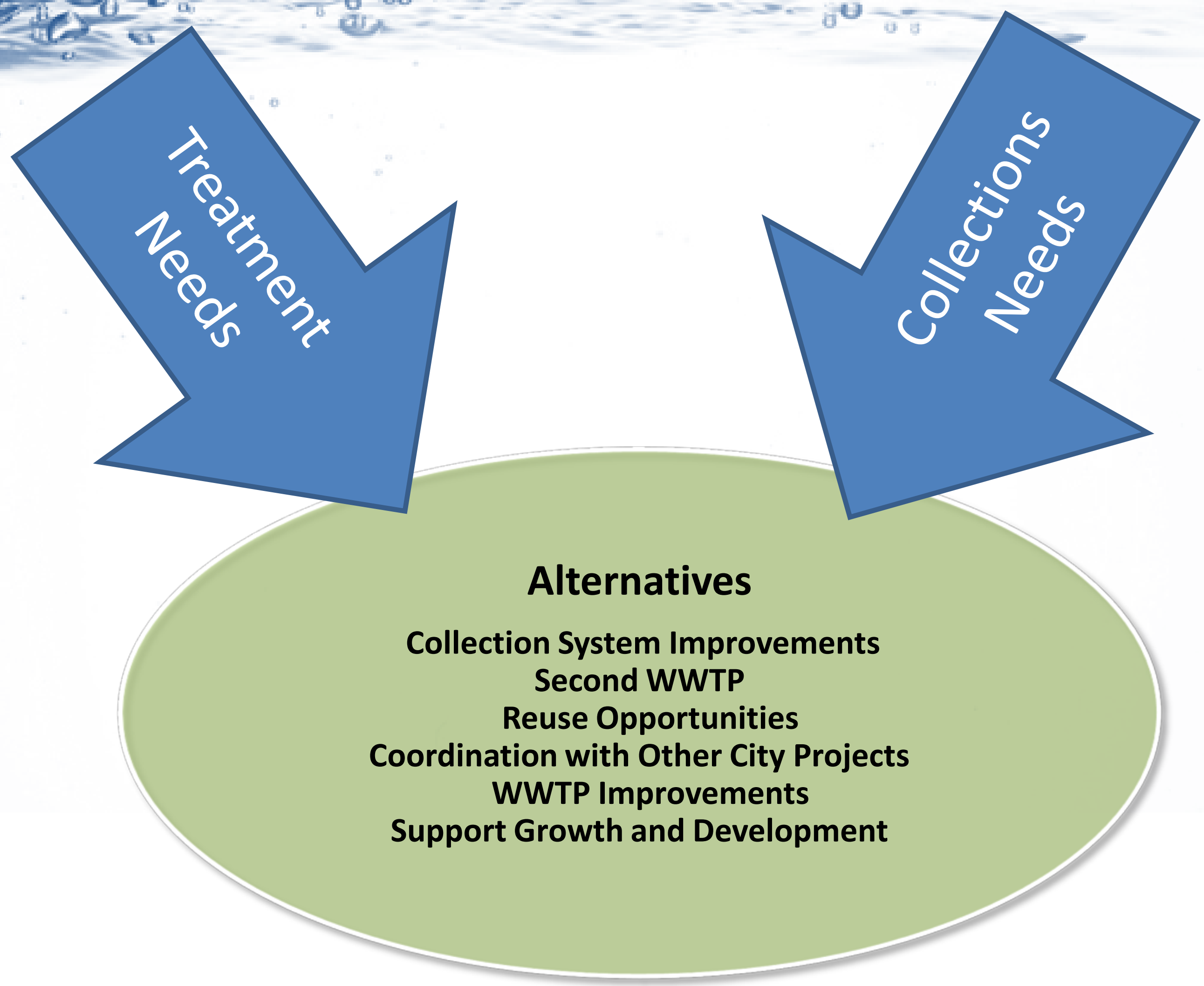
- Evaluate Treatment Processes
- Define System Capacity
- Evaluate for:
  - Current
    - Flows
    - Permit Conditions
  - Future
    - Flows
    - Regulations

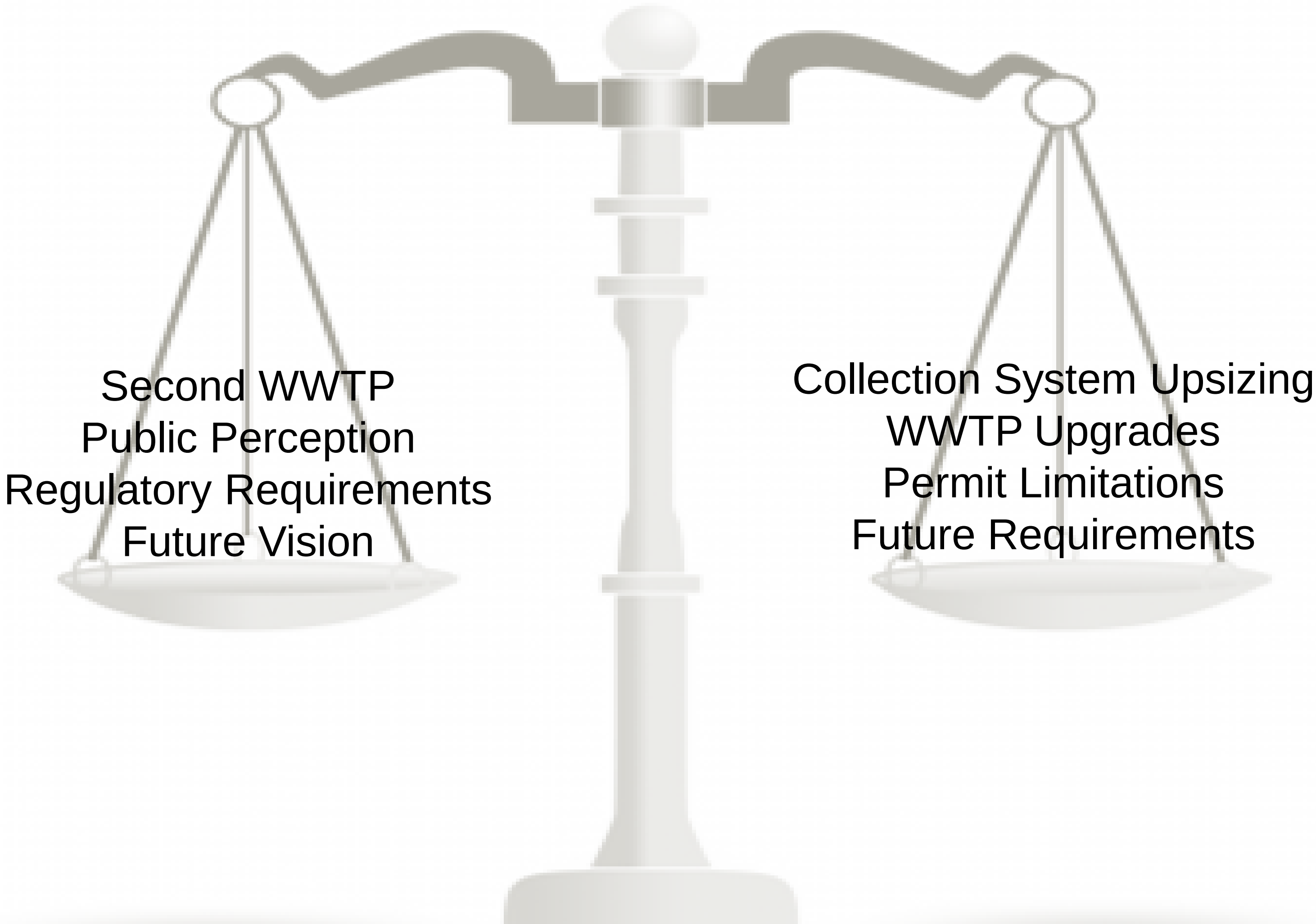
Treatment Analysis Results



- Plant capacity 5.9 – 7.8 MGD
- Future nutrient removal
- Process improvements to meet capacity needs

Next Steps


Treatment Needs
Collections Needs
Alternatives
Collection System Improvements
Second WWTP
Reuse Opportunities
Coordination with Other City Projects
WWTP Improvements
Support Growth and Development



Alternatives Analysis - Weighing the Options…

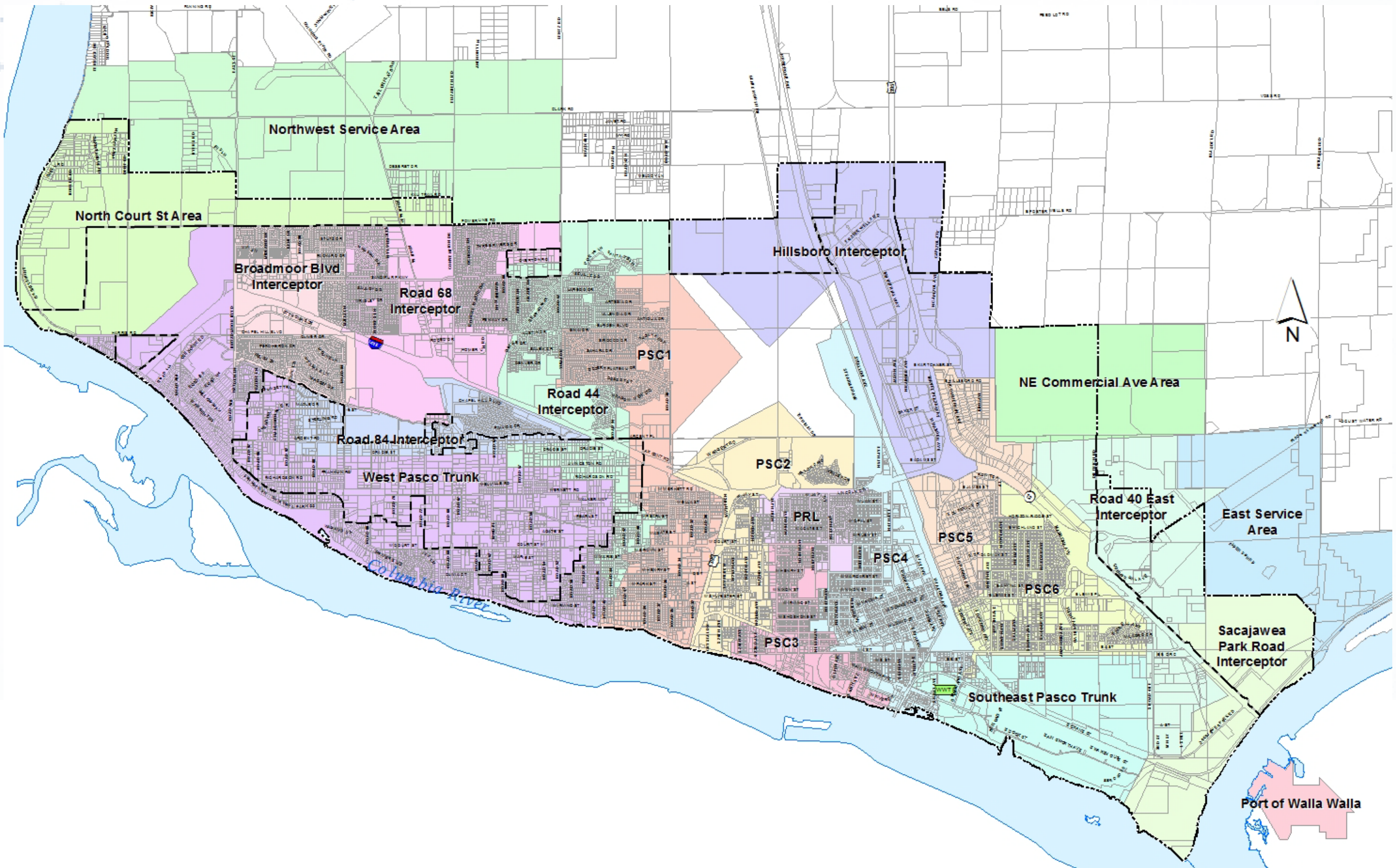
Next Steps

- Capital Improvement Plan (CIP) Development
  - Preferred Alternatives Selected – Projects Defined
  - Project Budgets Estimated
  - Implementation Strategy
    - 0-6 Years
    - 6-20 Years
    - 20 years & beyond
- Financial Considerations
- Documentation

Comprehensive Sewer Plan

- Defines Future Vision for Wastewater Management
- Usable Documents & Tools
  - Provides a “Road Map”
  - Supports City’s Comprehensive Plan
  - Modeling, GIS Based
- Agency Compliant

Questions/Open Forum



Presentation for

Comprehensive Sewer Plan

CITY OF PASCO

Ahmad Qayoumi, PE
Public Works Director

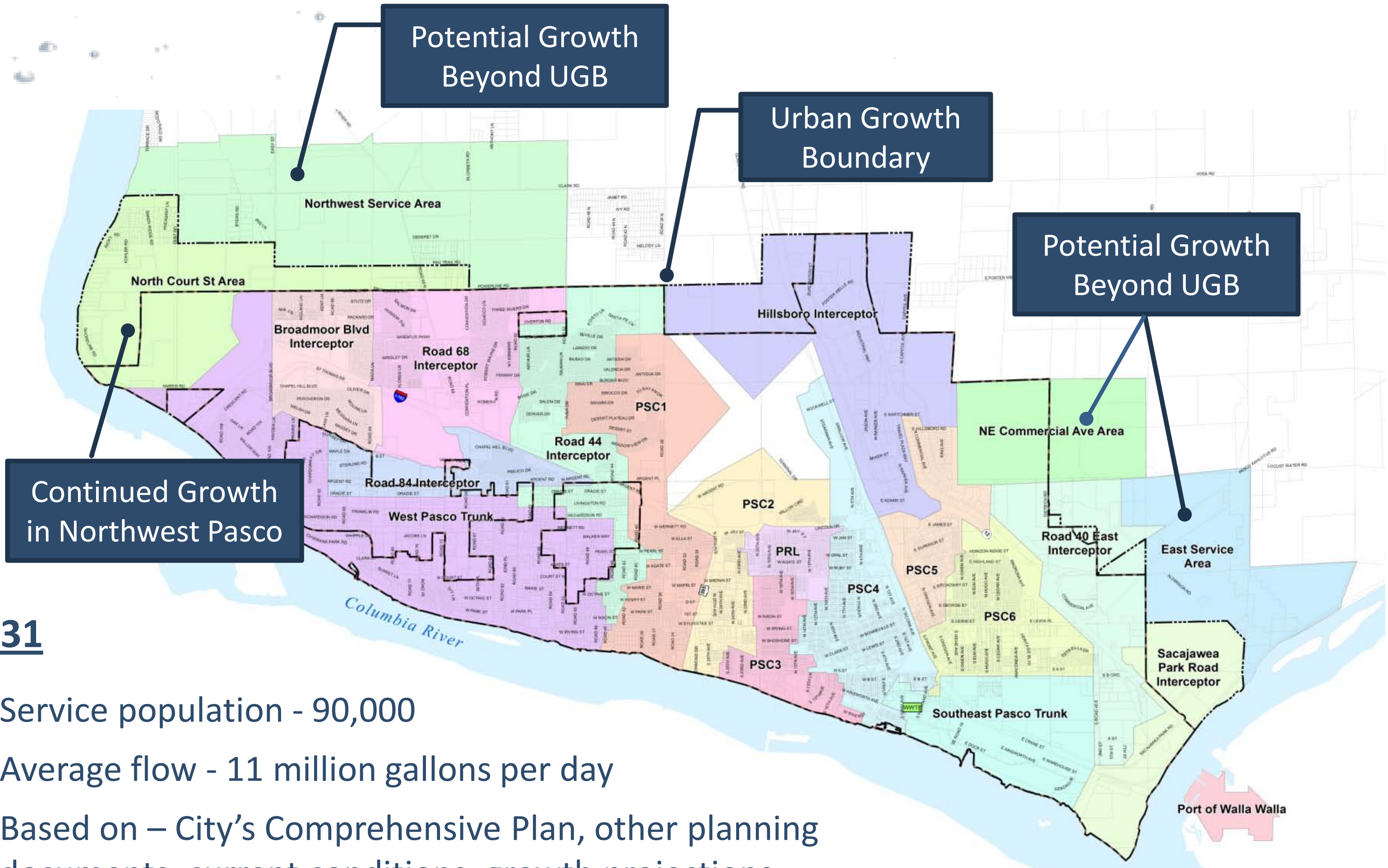
MSA
Murray, Smith & Associates, Inc.

Tom Perry, PE
Project Manager

To develop a plan that will define an effective, sustainable and economical approach to manage the current and future wastewater needs for the City of Pasco.

January 28, 2013

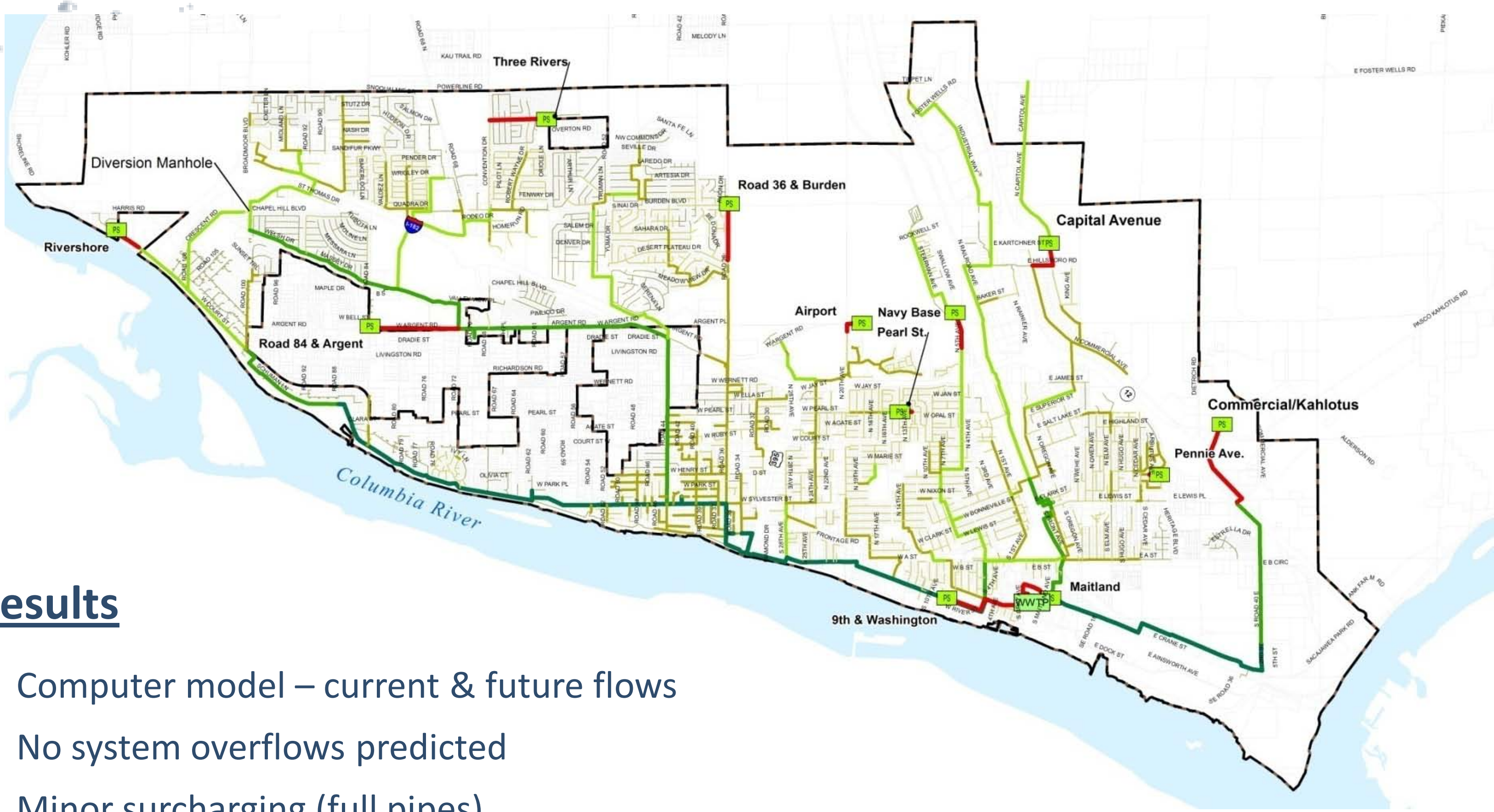
Future Conditions



__2031__

- Service population - 90,000
- Average flow - 11 million gallons per day
- Based on – City's Comprehensive Plan, other planning documents, current conditions, growth projections

Collection Analysis Results

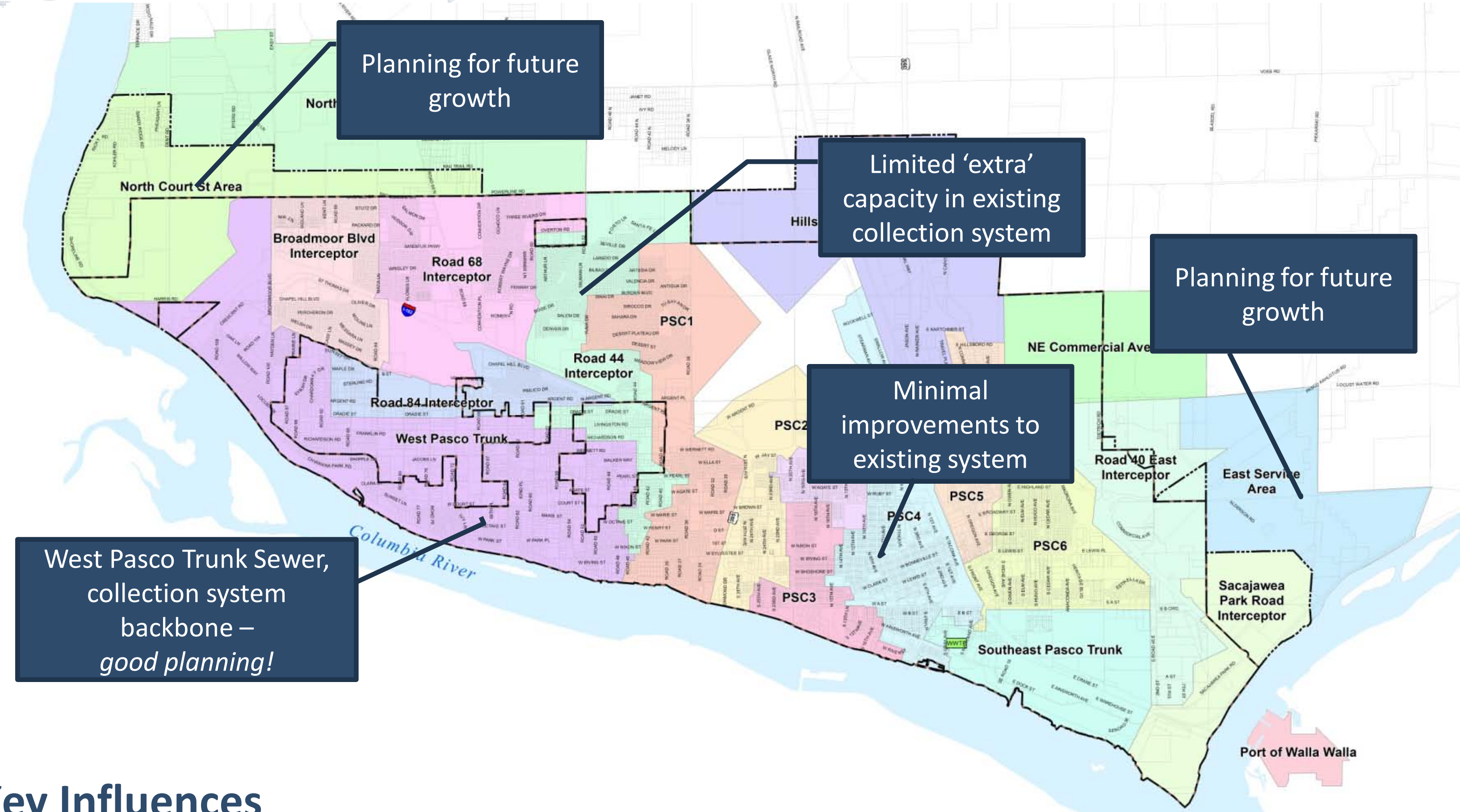


Results

- Computer model – current & future flows
- No system overflows predicted
- Minor surcharging (full pipes)
- Minimal improvements to existing system

Defining Alternatives

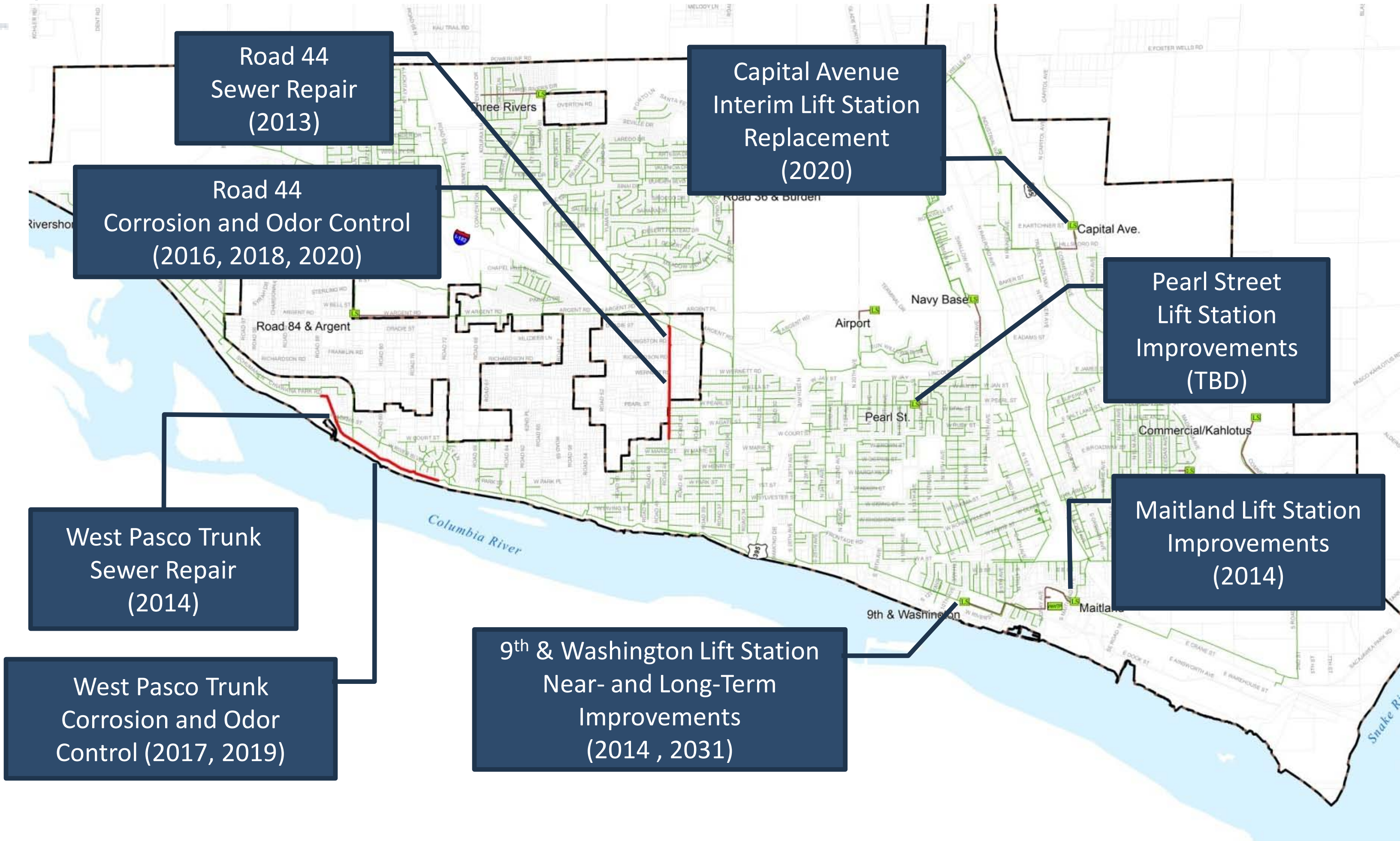
COLLECTION SYSTEM



Key Influences

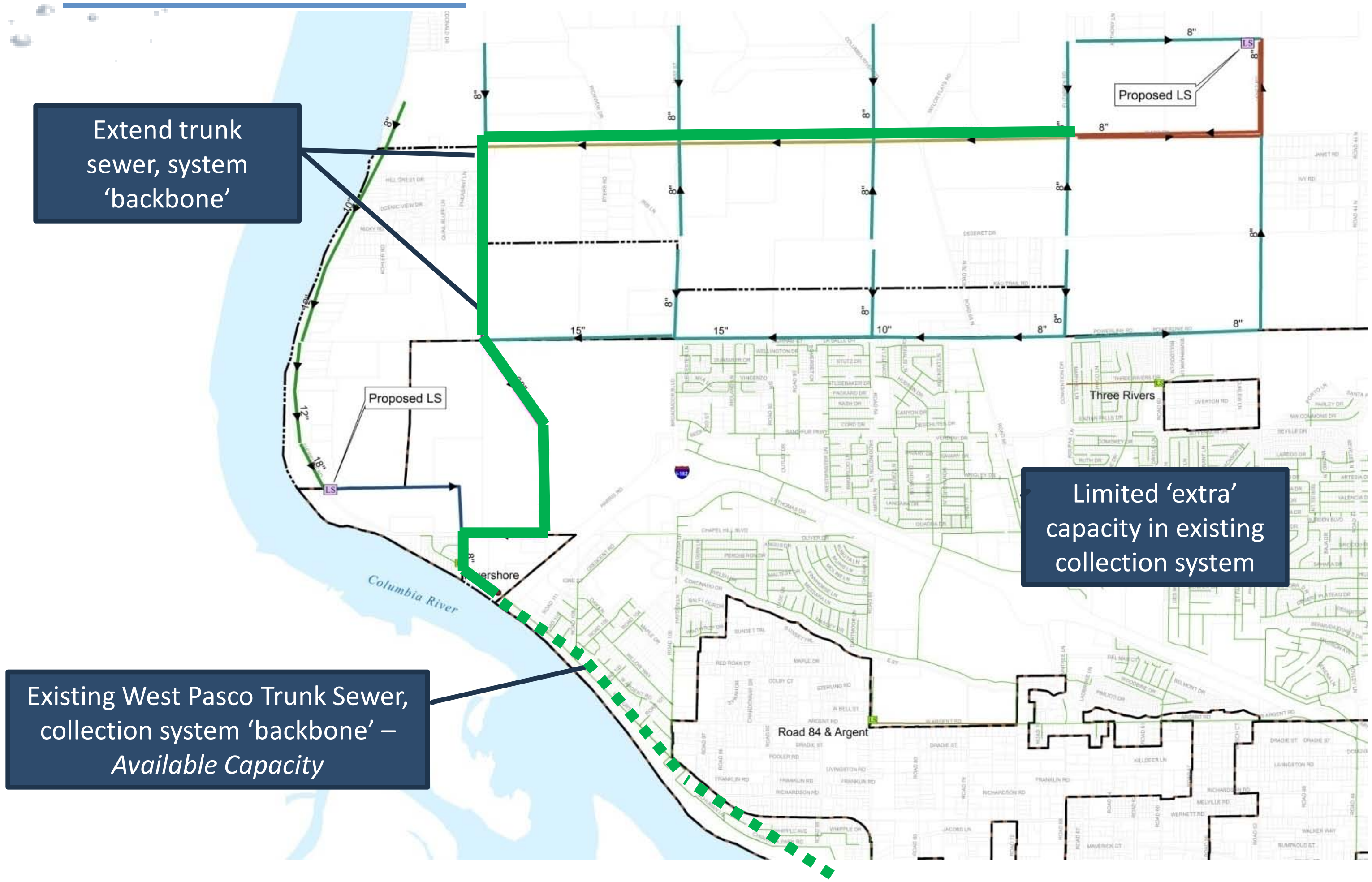
Existing Collection System

RECOMMENDED CAPITAL IMPROVEMENTS



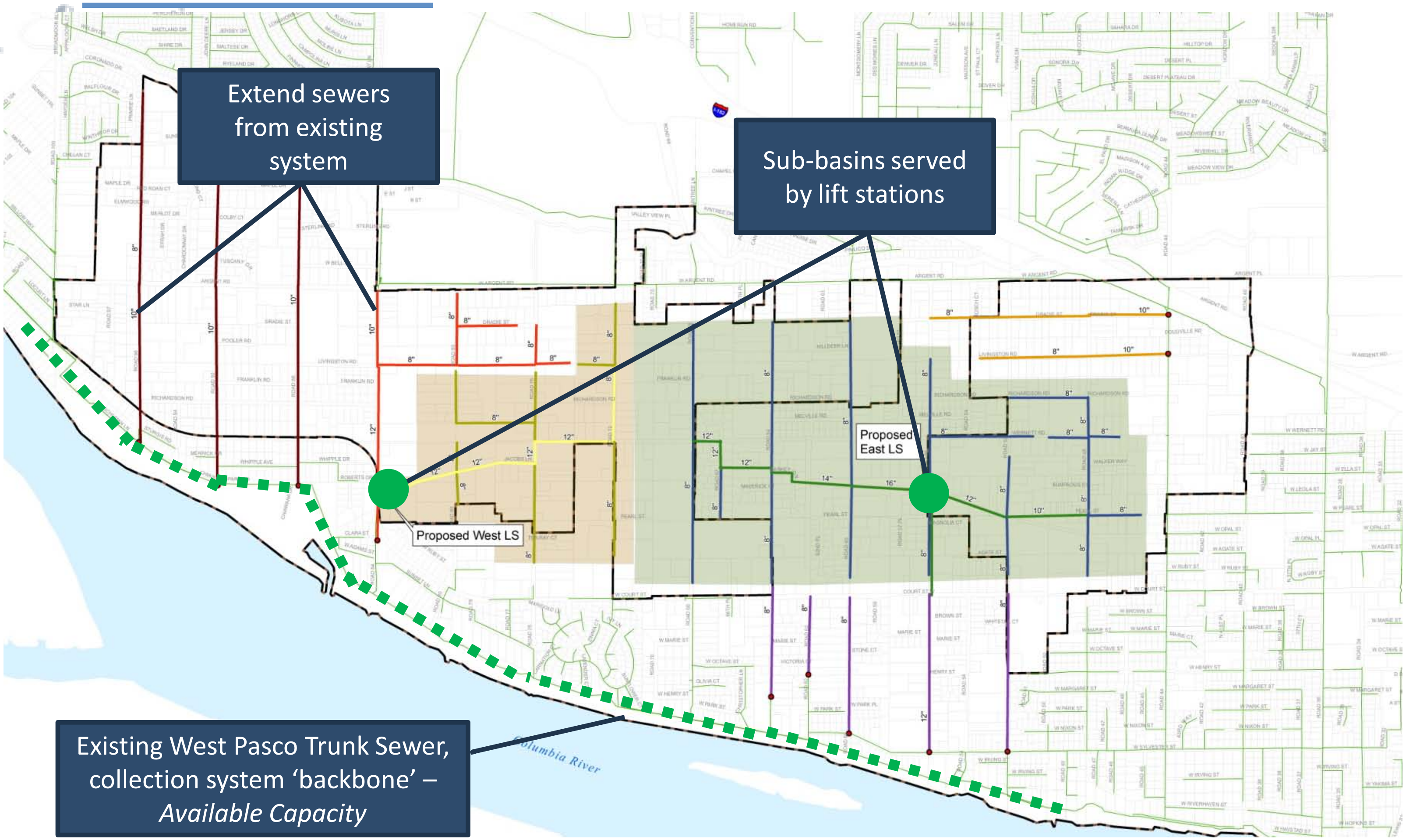
Future Service Areas

NORTHWEST



Future Service Areas As Needed

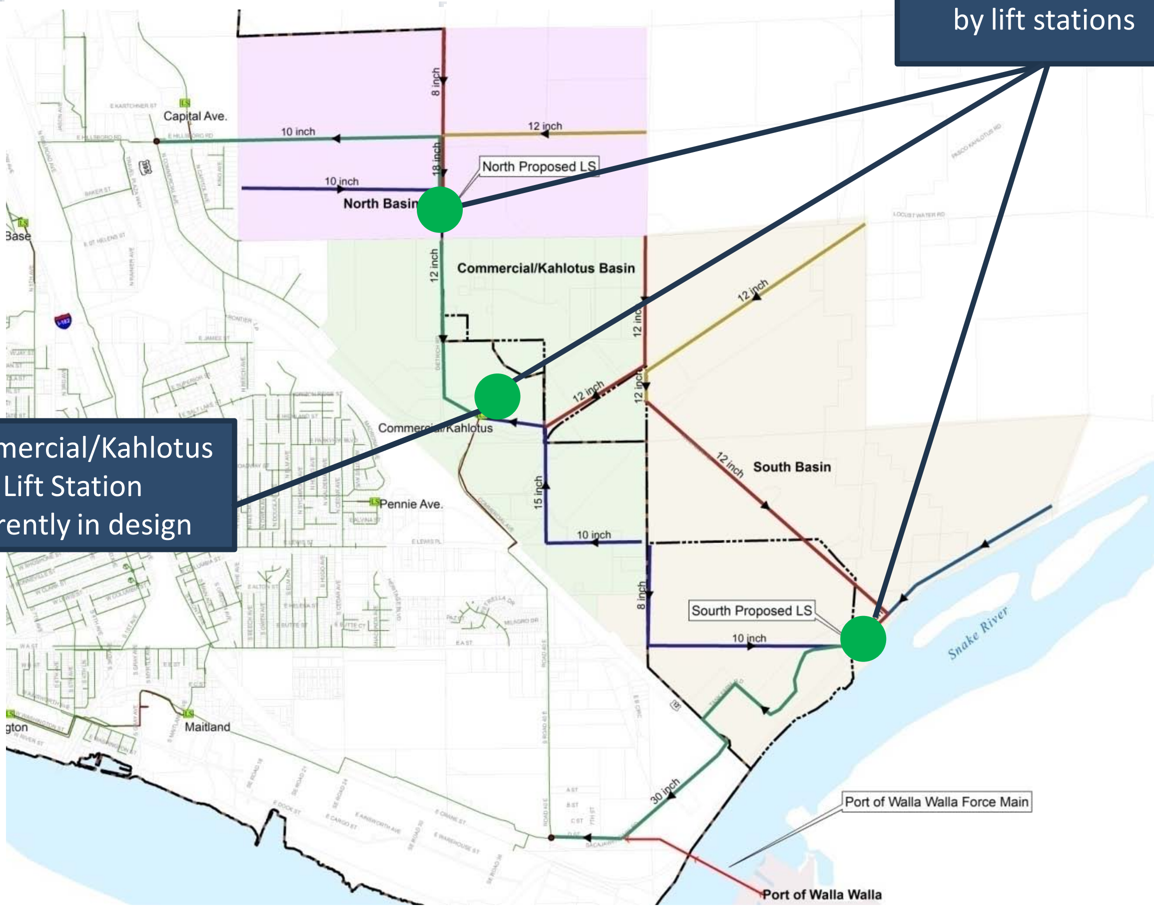
RIVERVIEW



Future Service Areas

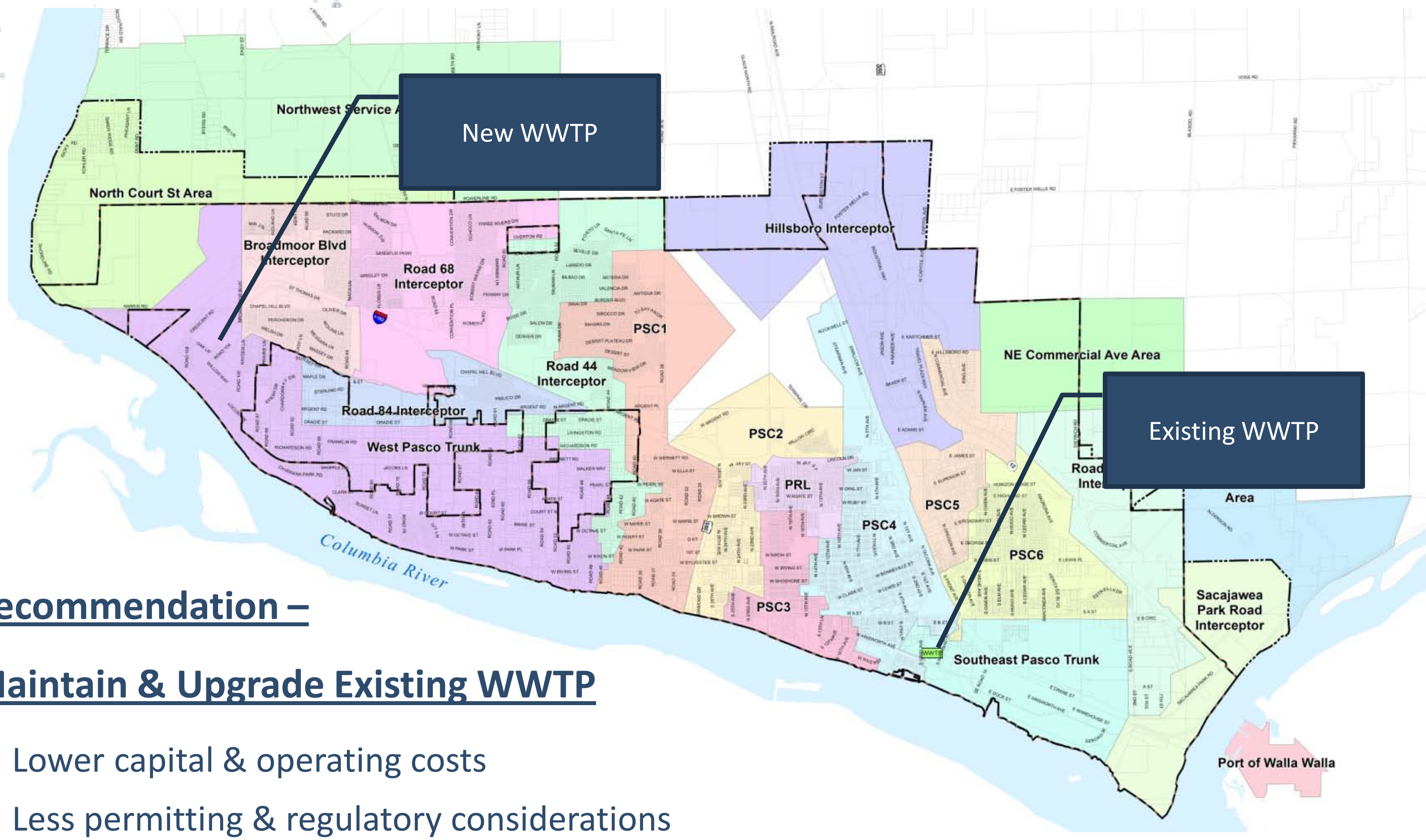
EAST INDUSTRIAL

Sub-basins served by lift stations



Commercial/Kahlotus Lift Station currently in design

Alternatives Analysis



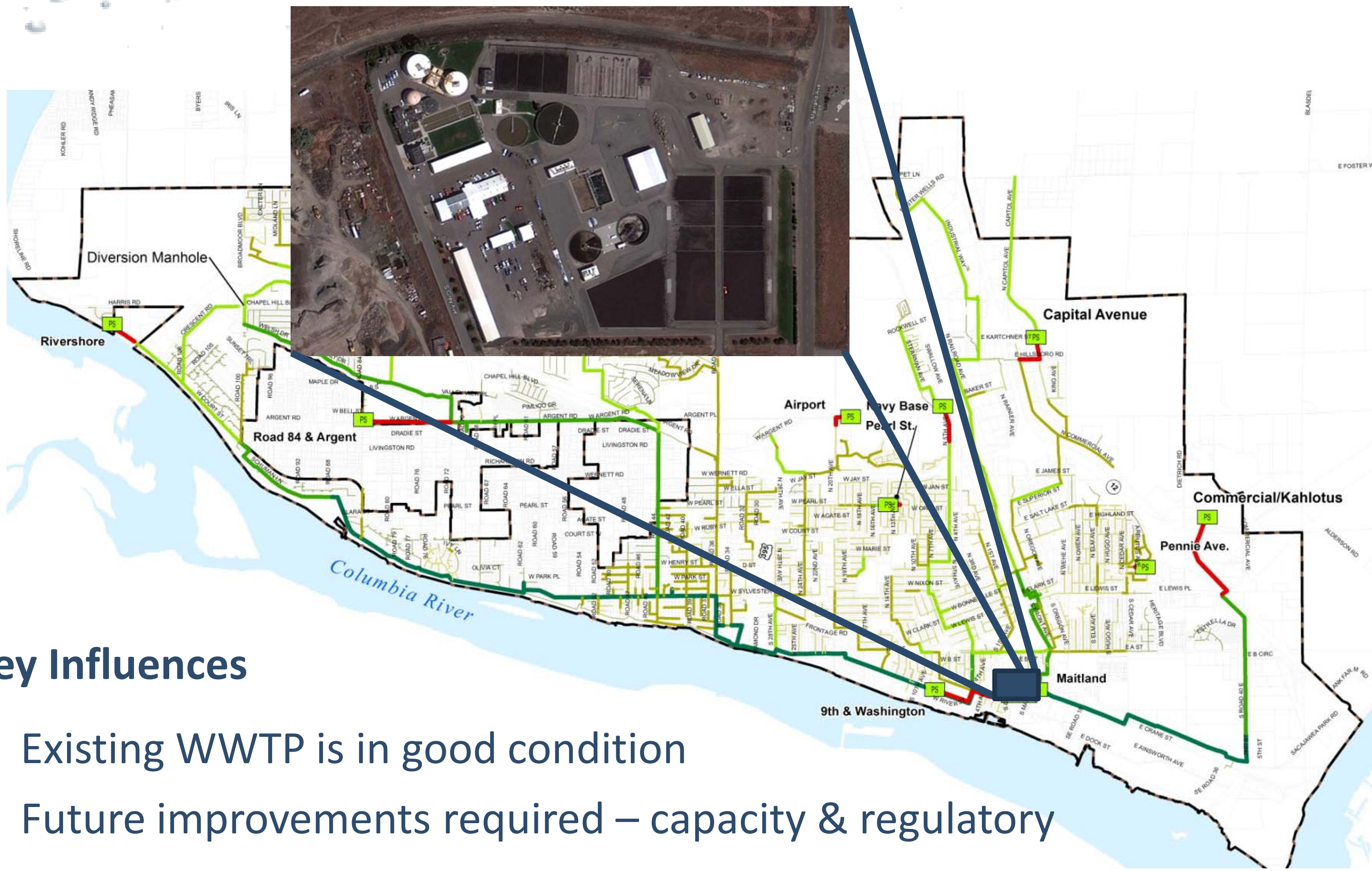
Recommendation –

Maintain & Upgrade Existing WWTP

- Lower capital & operating costs
- Less permitting & regulatory considerations
- Less impacts on existing collection & treatment systems

Defining Alternatives

WASTEWATER TREATMENT

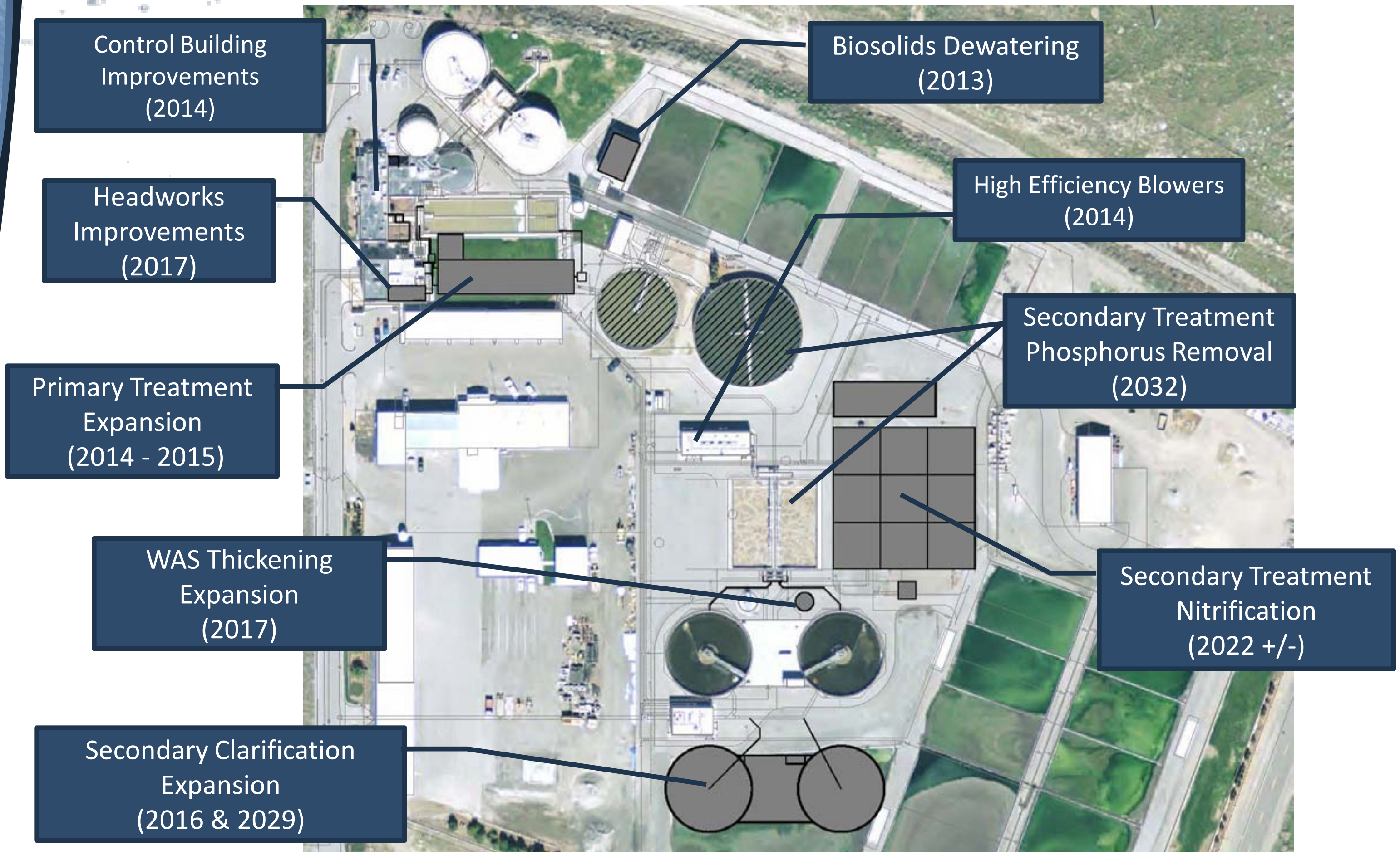


Key Influences

- Existing WWTP is in good condition
- Future improvements required – capacity & regulatory

Wastewater Treatment Plant

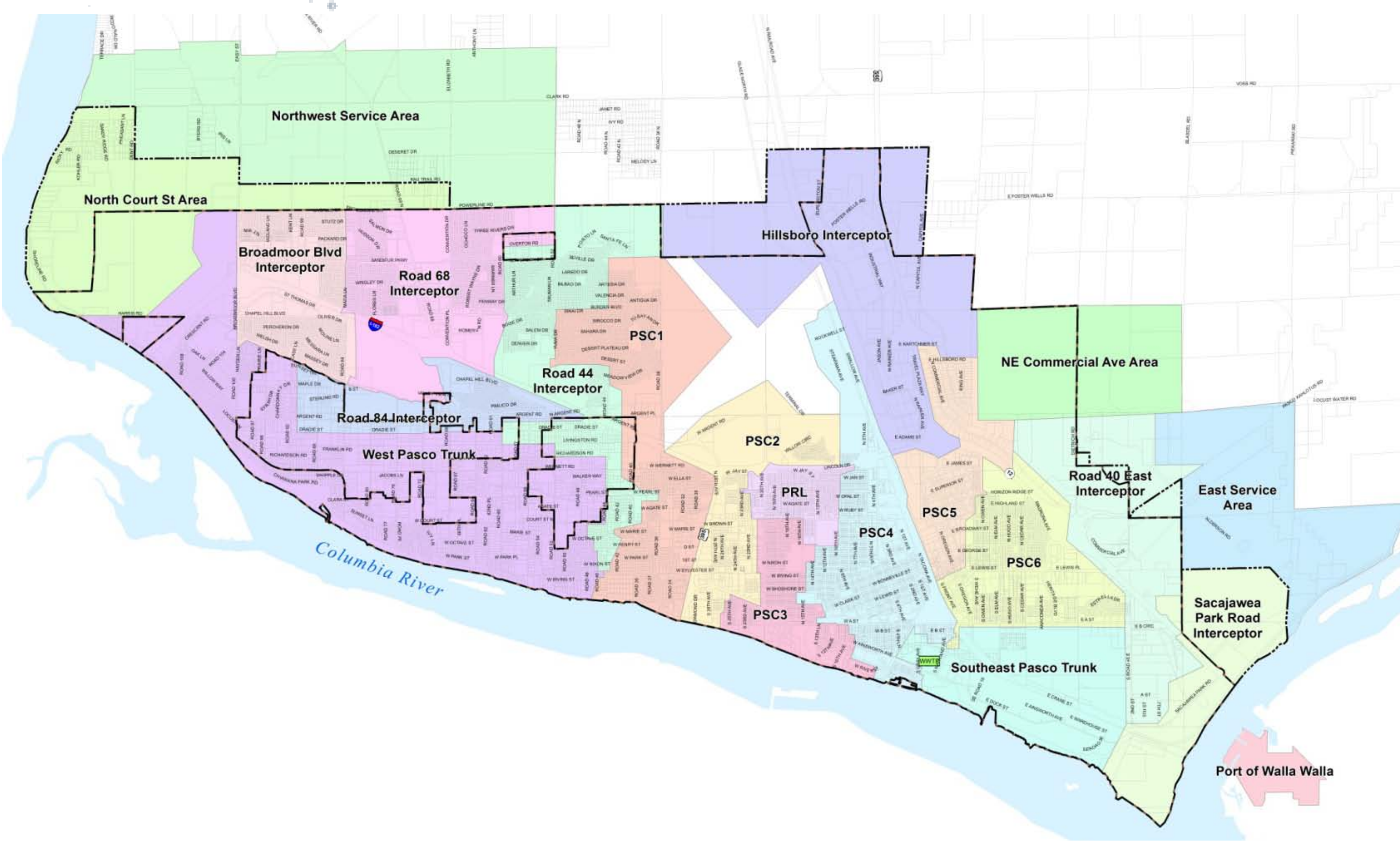
RECOMMENDED CAPITAL IMPROVEMENTS



Next Steps

– Financial Considerations/Impacts
– Documentation
– Department of Ecology Review & Approval
– City Adoption

Questions/Open Forum



MSA

APPENDIX F

SEPA 2014-022 PASCO COMPREHENSIVE SEWER PLAN (ADOPTION)

RECEIVED: 4/13/14

State Environmental Policy Act (SEPA) Environmental Checklist ACTION : 4/15/14
WAC 197-11-960

City of Pasco Comprehensive Sewer Plan
525 N. Third Avenue
Pasco, WA 99301
www.pasco-wa.gov/

Purpose of checklist:

The State Environmental Policy Act (SEPA), chapter 43.21C RCW, requires all governmental agencies to consider the environmental impacts of a proposal before making decisions. An environmental impact statement (EIS) must be prepared for all proposals with probable significant adverse impacts on the quality of the environment. The purpose of this checklist is to provide information to help you and the agency identify impacts from your proposal (and to reduce or avoid impacts from the proposal, if it can be done) and to help the agency decide whether an EIS is required.

Instructions for applicants:

This environmental checklist asks you to describe some basic information about your proposal. Governmental agencies use this checklist to determine whether the environmental impacts of your proposal are significant, requiring preparation of an EIS. Answer the questions briefly, with the most precise information known, or give the best description you can.

You must answer each question accurately and carefully, to the best of your knowledge. In most cases, you should be able to answer the questions from your own observations or project plans without the need to hire experts. If you really do not know the answer, or if a question does not apply to your proposal, write "do not know" or "does not apply." Complete answers to the questions now may avoid unnecessary delays later.

Some questions ask about governmental regulations, such as zoning, shoreline, and landmark designations. Answer these questions if you can. If you have problems, the governmental agencies can assist you.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Use of checklist for nonproject proposals:

Complete this checklist for nonproject proposals, even though questions may be answered "does not apply." in addition, complete the supplemental sheet for nonproject actions (part D).

For nonproject actions, the references in the checklist to the words "project," "applicant," and "property or site" should be read as "proposal," "proposer," and "affected geographic area," respectively.

A. Background

1. Name of proposed project, if applicable:

   City of Pasco Comprehensive Sewer Plan

2. Name of applicant:

   City of Pasco, Washington

3. Address and phone number of applicant and contact person:

   David McDonald
   525 N. Third Avenue
   Pasco, WA 99301
   (509) 544-3080

4. Date checklist prepared:

   January, 2014

5. Agency requesting checklist:

   City of Pasco, Washington Public Works

6. Proposed timing or schedule (including phasing, if applicable):

   The Comprehensive Sewer Plan will guide the development and upgrade of the City of Pasco's wastewater collection and treatment systems over the next 20 years. Minor changes and adjustments to the Comprehensive Sewer Plan will occur throughout this period to accommodate the City's growth and development.

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

   Yes, as the City continues to grow and develop, the Comprehensive Sewer Plan will be reviewed and updated periodically to accommodate this growth.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

   None

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

No applications are pending.

10. List any government approvals or permits that will be needed for your proposal, if known.

Adoption by the City of Pasco's City Council and approval by the Washington Department of Ecology.

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

The Comprehensive Sewer Plan is a plan to identify wastewater collection and treatment improvements over the next twenty years necessary to accommodate growth and provide a safe, reliable, and cost-effective sewer system for the City of Pasco that is compliant with all local, state and federal regulations. This Comprehensive Sewer System Plan is required by the state of Washington Depart of Ecology (WAC 173-240).

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

The City of Pasco is located in Southeastern Washington at the confluence of the Snake River and the Columbia River in Franklin County. See attached map.

The January 2014 Comprehensive Sewer Plan prepared by Murray, Smith & Associates, is available as City Hall for review.

B. Environmental Elements

Items 1-16 do not apply because this proposal is a nonproject, a planning document and not a site specific project.

The projects identified in the Comprehensive Sewer Plan will be developed in more detail as the projects are implemented over time. Specific project details and mitigation related to the construction will be addressed under project-specific SEPA environmental review during the permitting phase of the specific projects in compliance with local, state and federal environmental laws and requirements.

C. Supplemental Sheet for Non-Project Actions

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment. When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?

   The Comprehensive Sewer Plan does not propose to increase discharges to water, emissions to air, or the production, storage or release of substances that are toxic or hazardous and the increase of noise. The projects identified in the Comprehensive Sewer Plan are intended to reduce the risks of environmental contamination.

   Proposed measures to avoid or reduce such increases are:

   The Comprehensive Sewer System Plan is a plan to identify improvements over the next twenty years necessary to accommodate growth and provide a safe, reliable, and cost-effective sewer system from collection to treatment which is intended to reduce discharges of contaminants or material which could lead to environmental contamination.

2. How would the proposal be likely to affect plants, animals, fish, or marine life?

   The Comprehensive Sewer Plan will have a beneficial effect on plants, animal, fish and marine life in and around the City of Pasco.

   Proposed measures to protect or conserve plants, animals, fish, or marine life are:

   This Comprehensive Sewer Plan protects plants, animals, fish and marine life "project by project" by ensuring the proper collection and treatment of contaminants in wastewater and discharging effluent within the limits set forth in the City's National Pollution Discharge Elimination System (NPDES) Permit issued by the Washington State Department of Ecology.

3. How would the proposal be likely to deplete energy or natural resources?

   This Comprehensive Sewer Plan is not proposed to deplete energy or natural resources.

   Proposed measures to protect or conserve energy and natural resources are:

This Comprehensive Sewer Plan protects and conserves our energy and natural resources through identification of energy efficient and sustainable projects that will result in a cost effective wastewater system for the City of Pasco.

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?

   Not very likely to use or affect environmentally sensitive areas in a degrading manner.

   Proposed measures to protect such resources or to avoid or reduce impacts are:

   The projects identified in the Comprehensive Sewer Plan will be subject to ESA issues and addressed either with a Section Seven Consultation or Best Management Practices for Maintenance and Operation programs. Each new project is assessed on its individual merits through the SEPA process. Projects next to or adjacent to the Columbia River, Snake River are likely to need further environmental work to reduce their impacts.

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

   The Comprehensive Sewer Plan will not affect land and shoreline use. The Comprehensive Sewer Plan was develop to support and is compliant with the City of Pasco's Comprehensive Plan.

   Proposed measures to avoid or reduce shoreline and land use impacts are:

   Does not apply.

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

   The Comprehensive Sewer Plan will not increase demands on transportation or public services and utilities. The Comprehensive Sewer Plan was develop to support and is compliant with the City of Pasco's Comprehensive Plan.

   Proposed measures to reduce or respond to such demand(s) are:

   Does not apply.

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

This Comprehensive Sewer Plan does not conflict with any existing local, state, or federal laws or requirements for the protection of the environment. Specific projects that result from recommendations contained in the Plan will need to be considered in terms of their compliance with all local, state, or federal environmental laws and requirements.

D. Signature

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make ~~its~~ decision.

Signature: ....

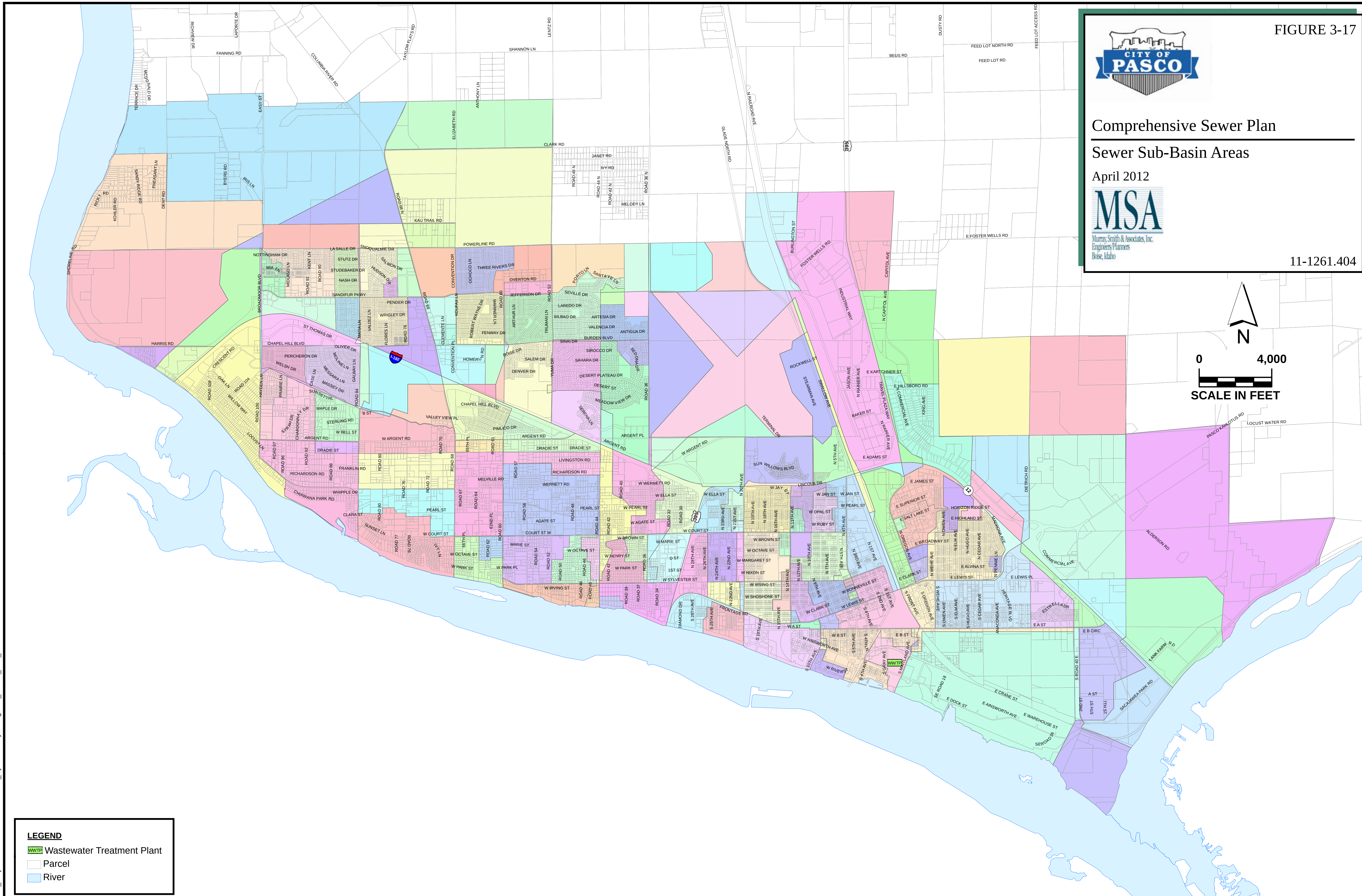
Date Submitted: 4/15/2014 ....

Community Development Dept.

This application was reviewed by the Planning Division of the Community and Economic Development Department. Any comments or changes made by the Department are entered in the body of the checklist and contain initials of the reviewer.

Reviewer Signature 4/15/14 Date

SHANE O'NEILL PASCO PLANNER I



CITY OF PASCO

FIGURE 3-17

Comprehensive Sewer Plan

Sewer Sub-Basin Areas

April 2012

MSA
Murray, Smith & Associates, Inc.
Engineers/Planners
Boise, Idaho

11-1261.404

LEGEND

WWTP Wastewater Treatment Plant

Parcel

River

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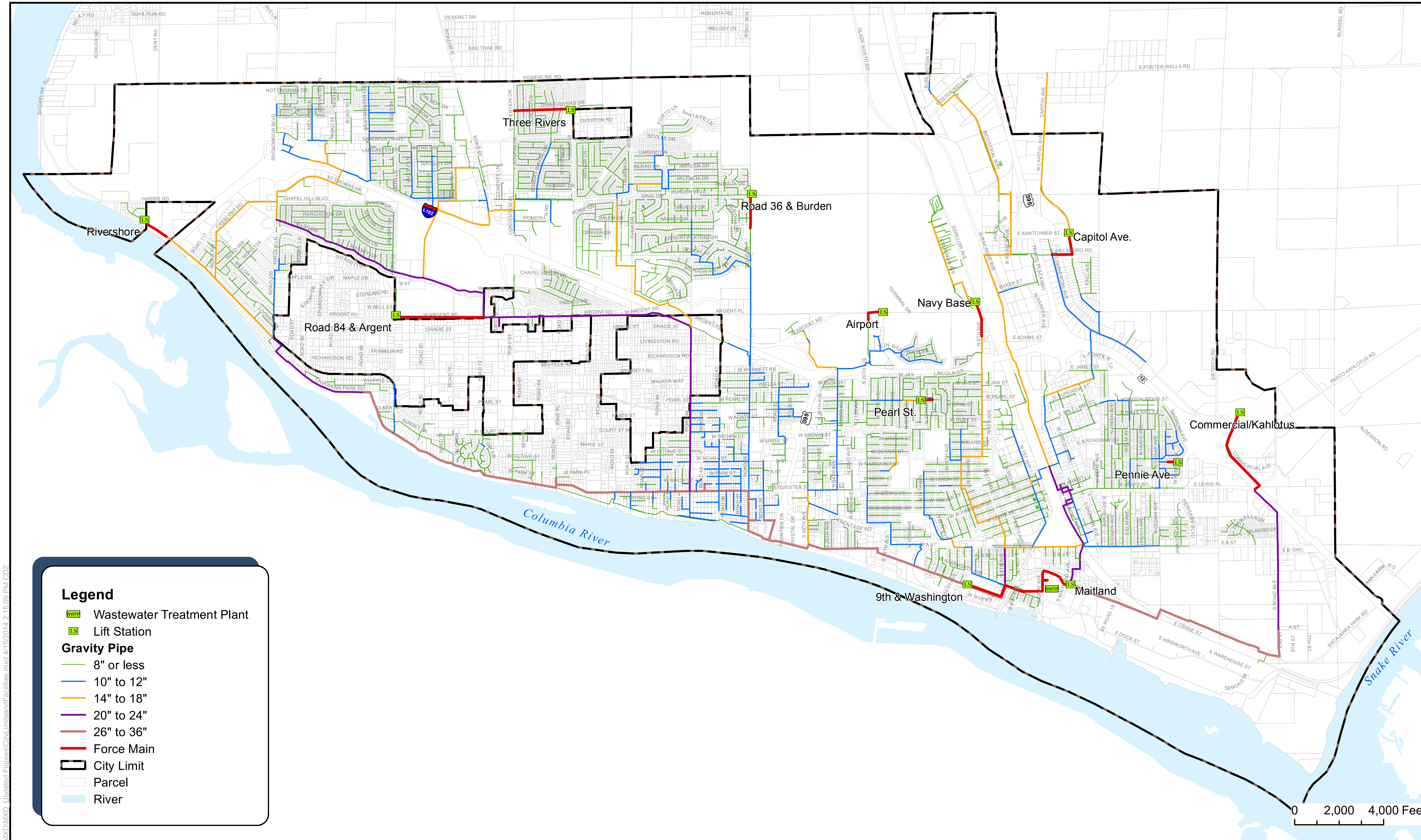

Comprehensive Sewer Plan

City Limits and Wastewater Facilities

February 2013

11-1261

CITY OF PASCO
COMMUNITY DEVELOPMENT DEPARTMENT (509) 545-3441 / Fax (509) 545-3499
P.O. Box 293, 525 North Third Avenue, Pasco, Washington 99301

DETERMINATION OF NON-SIGNIFICANCE

Description of Proposal: Adoption of the Pasco's Comprehensive Sewer Plan, a document analyzing the city's wastewater collection and treatment systems to identify existing deficiencies and determine their capabilities to meet future conditions.

Proponent: City of Pasco
PO Box 293
Pasco, WA 99301

Location of Proposal: Applies to the City of Pasco Urban Growth Boundary and beyond

Lead Agency: City of Pasco

The lead agency for this proposal has determined that adoption of the Comprehensive Sewer Plan does not have a probable significant adverse impact on the environment. An environmental impact statement (EIS) is not required under RCW 43.21C.030(2) (c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public on request.

☐ There is no comment period for this DNS.

■ This DNS is issued under WAC 197-11-340(2); the lead agency will not act on this proposal for 14 days from the date below. Comments must be submitted by: **May 2, 2014**

Responsible Official: David I. McDonald

Position/Title: CITY PLANNER

Address: P. O. BOX 293, PASCO, WA 99301-0293

Phone: (509) 545-3441

Date: 4/15/2014

Signature: ______________________

ED Number: SEPA2014-022

Master File Number: [NA]

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